

Output Tapers, Stocking Ends

With Field Supplies Adequate Industry Gears Car Production to Retail Demand

by Athel F. Denham

Detroit Editor, Automotive Industries

DETROIT—Both production and retail deliveries of passenger cars were off an estimated 10 per cent in the first week of May as compared with same period in April. More complete factory reports on retail domestic deliveries during April indicate a total of 265,000, including roughly 225,000 passenger cars.

Dealer new car stocks have reached the point now where reductions are indicated as desirable for the majority of lines. At present they are estimated to aggregate approximately 35 days' supply of cars. The industry can roughly be divided into two groups on the stock question. Chevrolet Standard, LaSalle, Lafayette, Cadillac 12, DeSoto, Aerodynamic Hupmobiles, Chrysler Airflow, Oldsmobile 6 and Buick 40 cars may be classed as being relatively understocked, the sup-

ply for this group averaging roughly 25 days. The remainder of the industry averages closer to 40 days' supply.

It is obvious therefore that for the most part the industry will gage its production by retail deliveries from here on and if a sharp drop in sales should develop an even sharper reduction in schedules by most companies would be necessary the latter part of May and June.

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Official Inspection of New Buick "40"



The first of the new Buick line is being gone over by company officials as it came off the assembly line recently. In the photograph, reading from left to right are George T. Christopher, manufacturing manager; W. F. Hufstader, Buick sales manager; F. A. Bower, chief engineer, and Harlow H. Curtice, Buick president. For complete description see article on page 580

Buick 40's Place in GM's Price Picture

	Range	4 d. Sedan
Chevrolet Standard	\$490- \$520	None
Chevrolet Master..	575- 705	\$675
Olds Six.....	675- 795	765
Pontiac.....	715- 805	805
BUICK 40.....	795- 925	895
Olds Eight.....	910-1,020	990
Buick 50.....	1,110-1,230	1,190
Buick 60.....	1,375-1,675	1,425
LaSalle.....	1,595-1,695	1,695
Buick 90.....	1,875-2,175	1,945
Cadillac.....	2,545-7,500	2,645*

*V-8.

ALB Insists Minority Be Heard In Disputes

G.M. Workers Return at Cleveland - St. Louis

DETROIT—All is relatively quiet on the Detroit labor front. There are rumblings under the surface, however, that point to further controversy over the representation question with the Automobile Labor Board standing for the right of minorities to select representatives as the law has been interpreted by the President and General Johnson. The American Federation, of course, sides with the National Labor Board view that representatives selected by the majority represent all the workers.

The Federation also is reported to be objecting to striking the names of men who have not paid dues from union lists in accordance with the procedure adopted by the Automobile Board in analyzing union membership roles to determine representation.

Striking workers in the Chevrolet and Fisher Body plants in Cleveland and St. Louis have returned to work.

G.M. to Show Cars in 55 Cities in Week of June 2

DETROIT—General Motors will hold showings of its 1934 models in 60 cities during the week beginning June 2, it is reported on reliable authority although official confirmation is lacking. It is understood that the exhibitions will be similar in general character to those staged in 55 cities in April, 1932.

Johnson Still Opposes "Majority Rule" Principle Set Up By Wagner and NLB

WASHINGTON—Unless the present act is amended there cannot be a "majority rule" so far as the NRA is concerned, General Hugh S. Johnson has announced in discussing method of negotiating labor disputes.

The administrator said that he did not want to go into details about the Wagner labor bill until Senator Wagner has announced it, but went on record again as opposing the idea of elected representatives of the majority speaking for an entire working force in a plant unless legislation granting such authority is enacted. He contended that at present Section 7a, relating to collective bargaining in the Recovery Act does not permit adoption of such a rule.

The rule, nevertheless, has been adopted by the National Labor Board of which Senator Wagner is chairman. It runs counter to the principle laid down by President Roosevelt in setting up the National Automobile Board. It is likewise contrary to a joint interpretation made previously by General Johnson and Donald Richberg, general counsel for the NRA.

While neither General Johnson nor Mr. Richberg has opposed the majority rule principle itself, it is their contention that it cannot be applied under the law as it now exists.

For some time Senator Wagner, Mr. Richberg and Secretary of Labor Frances Perkins have been redrafting the Wagner bill, which in its original form is definitely in the discard. It is said that Senator Wagner soon will introduce the revised measure but no definite indication as to its character has been given. However, it is said it does propose the "majority rule," though in some quarters this is considered doubtful in view of the opposing principle established in the Automobile Board set-up. The President apparently has taken no part in directing redrafting of the bill since he suggested that the New York Senator, the general counsel of the NRA, and the Secretary of Labor prepare a new measure with the intention of offering it for passage at the present session.

General Johnson was asked his opinion as to the success of the Automobile Labor Board in "cleaning up" strikes.

"You know what its performance has been," he replied. "I think it has been highly successful in view of the condition when they went out there," referring to the threatened automobile strike when the board began its work in Detroit.

The General said he did not know anything about the report that Dr. Leo Wolman is going to resign as chairman of

the Labor-Advisory Board. Dr. Wolman is also head of the Automobile Labor Board.

When asked about the request of the Labor Advisory Board to name various members of industrial relations committees under codes and the report that he had come back "with the crack that 'You would pack this thing with A. F. of L. men,'" General Johnson said that the idea of these committees is to have an impartial board. Where there is a company dominated union, the General said, he would concede that such a union is illegal. He said he told the Labor Advisory Board that it could nominate the panels but that he would do the selecting.

March Retail Car Sales Value Up 112%

Preliminary Estimates
by USDC Place Year's
Total 55% Above '33

WASHINGTON—Preliminary estimates of the value of retail sales of new passenger automobiles computed from the number of cars sold, as reported by the N.A.C.C., show an increase of 112 per cent for the month of March as compared with March, 1933, and an increase of 80 per cent as compared with March, 1932, according to the Bureau of Foreign and Domestic Commerce. Compared with February there was an increase of 50 per cent.

On Detroit Board



H. H. Rice, former president of Cadillac and vice-president of General Motors who has been named to the Detroit Regional Labor Board

The three months total for this year is 55 per cent higher than the corresponding total for 1933 and 29 per cent higher than the first three months of 1932.

Comparison of March, 1934, with the same month of previous years and the percentage changes from February to March in previous years are shown in the following tabulation:

March, 1934, compared with same month of previous years

March, 1934, was				
112	per	cent	higher	than
80	"	"	"	March, 1933
14	"	"	"	" 1932
44	"	"	lower	" 1931
59	"	"	"	" 1930
	"	"	"	" 1929

February—March change in previous years

Percentage Change	
March, 1934	+50.4
" 1933	+17.1
" 1932	+4.4
" 1931	+33.7
" 1930	+29.6
" 1929	+51.5

PHILADELPHIA—March registrations of new passenger cars at list prices were valued at \$120,766,000 as compared with \$53,926,976 a year ago, an increase of 124 per cent, *Automotive Industries* estimates. The increase shown is larger than the Commerce Bureau estimate due to the fact that *Automotive Industries* uses registrations as equivalent to sales, while the Bureau uses N.A.C.C. sales reports. The average list price for the month was \$695 against \$685 in March, 1933.

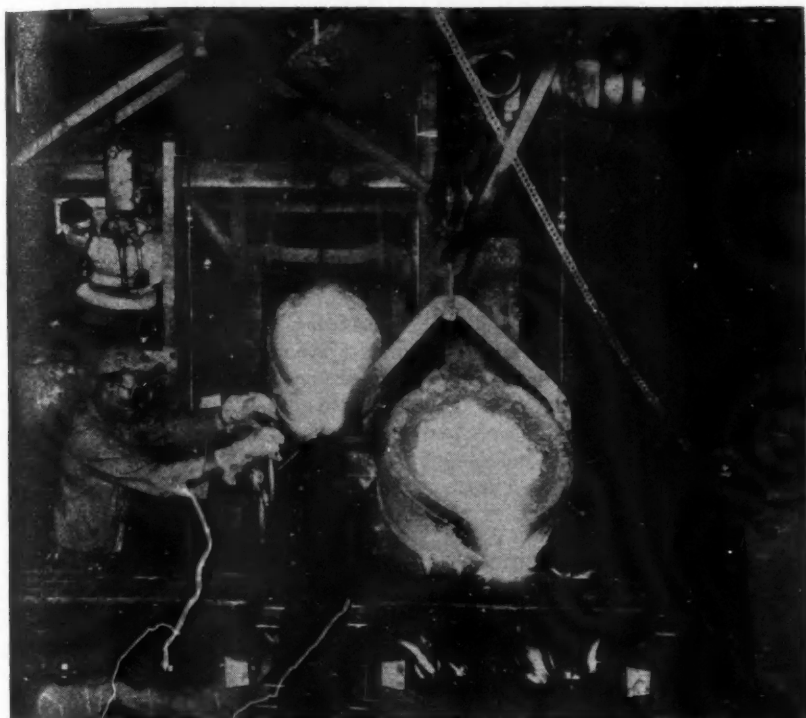
April Automobile Sales Increase 56% in Chicago

CHICAGO—An increase in Cook County automobile sales was recorded during April, according to figures compiled by R. L. Polk and Co. Registrations of new cars during the month totaled 7,702, an increase of 56 per cent over March, with total registrations of 4,931, and an increase of 70 per cent over April, 1933, when 4,533 cars were registered.

Production 1,120,000 In First Four Months

DETROIT—April production of approximately 360,000 gave the industry a good start on its second million for 1934. Total output at the end of four months approximated 1,120,000, or just about double the 557,000 units produced in the similar period last year.

N.A.C.C. members had the best month in April they have had since August, 1929, with an output of 269,569 units. This represents a slight increase over



Chevrolet's gray iron foundry, America's largest, sets all-time pouring record when 2,152 tons of molten metal were poured in one day to make castings for passenger car and truck parts. The average daily pour is 1,787 tons

Auto-Lite & Bingham Injunction Continued

Returning Strikers Sign Pledge to Refrain From Harassing Loyal Workers

TOLEDO—With the citation of four men for contempt of court for carrying banners at the Auto-Lite plant urging disregard of the court injunction and picketing rules, the injunction proceedings brought by the Auto-Lite company and the Bingham Stamping and Tool Co., were continued this week against the United Automobile Workers' Federal Union, No. 18384, and local Communist and Socialist organizations.

C. O. Miniger, Auto-Lite president, was subpoenaed to appear this week for questioning regarding wage, working conditions, and general employment policies of his organization. One charge the workers' union has made against Auto-Lite was to the effect that a check of \$1.09 was given an employee for seven hours work. Vice-President Minch denied the charge, explaining the check was a "balance check" given an inexperienced female worker who had been underpaid in her first pay check. Mr. Minch stated that complete reports are made monthly on wage rates to the APEM code authority.

About 65 M.E.S.A. members voted to return to work at the Auto-Lite plant the first of this week, and others were scheduled to be taken back in small groups each day. Those strikers who returned to work were required to sign a pledge that they would refrain from harassing those employees who remained loyal; they also lost all seniority ratings.

Several pickets at the Bingham Stamping and Tool Co. banded together during the week and petitioned the company for their old jobs. Pickets and banners completely disappeared from the plant entrances the latter part of last week.

March and a gain of 92 per cent over April last year.

Estimating Ford April production at 90,000, an industry total of about 360,000 is obtained. This compares with 350,173 in March and 188,968 in April last year.

In the first four months N.A.C.C. members built 814,697 cars and trucks, an increase of 88 per cent over the 381,841 units built in the similar period last year.

Chevrolet First in March But Ford Leads in Quarter

DETROIT—April passenger car sales in the United States are conservatively estimated at 225,000 units by R. L. Polk & Co. on the basis of partial returns. This represents an increase of 30 per cent over the 173,287 units which final reports show were registered in March and compares with 119,909 a year ago.

On the basis of this estimate for April, total registrations of new passenger cars in the first four months amounted to 564,000 as compared with 347,935 in the same period last year.

March truck sales in the United States amounted to 33,894 according to registration reports which contrasts sharply with 9934 units in March last year. The March total represented a gain of 38

per cent over the 24,476 units sold in February. Truck registrations in the first quarter of 1934 totalled 81,273 as compared with 31,350 in the first three months of 1933.

Chevrolet went back into first place in passenger car sales in March with Ford second and Plymouth third. On total first quarter business, however, Ford was ahead of Chevrolet.

Better Merchandising NSPA Follow-Up Plan Aim

DETROIT—A customer follow-up plan for the use of the repair shops has been developed by the National Standard Parts Association to aid its wholesaler members to increase their business by promoting better merchandising by their customers. The plan provides a visible card follow-up for larger shops and a card index system for smaller operators.

Budd Wheel Co. Sales Gain 312% This Year

PHILADELPHIA—An increase of 312 per cent in sales in the first four months of this year, compared with the corresponding period of last year, was announced this week by the Budd Wheel Company. April sales alone were 34 per cent greater than the total sales in the first four months of last year.

It Cost Less to Live In April—But Only 0.1%

NEW YORK—A reduction of 0.1 per cent in living costs occurred in April, according to the monthly survey of the National Industrial Conference Board. Declines in food and coal prices slightly more than offset advances in rents, clothing, and sundries. The cost of living of wage-earners in April was 9.7 per cent higher than in April of a year ago, but it was 20.9 per cent lower than in April, 1929.

The purchasing value of the dollar was 127.6 cents in April, as compared with 127.4 cents in March, 139.9 cents in April, 1933, and 100 cents in 1923.

Selfish Interest Scored By Sloan

Says Large Cross-Section Of Community Penalized By Uneconomic Policies

NEW YORK—Unsound economic policies and selfish or political interests in government fostering regulations of business detrimental to the effectiveness of industry in creating wealth and employment was roundly scored by Alfred P. Sloan, Jr., General Motors president, in his annual report to stockholders this week.

Mr. Sloan pointed out that American business, whether big or little, was not owned by the relatively few, but by "a relatively broad cross-section of the community at large." Opening his remarks on the subject of business and government after giving the corporation's financial report Mr. Sloan said: "I propose to deal with an entirely different subject. It is one which superficially might be recognized as outside our normal relationship. . . . I refer to the present trend of expansion in the relationship between government and industry.

"I mention these circumstances (after outlining the distribution of stock holdings in General Motors) to demonstrate the fact that uneconomic policies to the extent that they produce a detrimental effect upon business, do not penalize a limited few. They penalize the community at large and a continually increasing part of that community. This comes about through a lowered value of the investment which results from diminished earning power, limiting the opportunity to expand, to develop and to create, as well as reducing the ability of industry to produce purchasing power for its own products through restricting employment.

"Although it is unfortunate, nevertheless it cannot be denied that in our procedure the motives that result in the creation of our national policies are too seldom based upon sound economics, and too frequently actuated by the selfish interest of an organized minority, or by political considerations."

Extra Dividend Declared By Chrysler Directorate

DETROIT—Chrysler Corp. directors have ordered an extra dividend of 25 cents per share paid in addition to the regular quarterly dividend of 25 cents per share payable June 30 to stockholders of record June 1.

Net profits of the Chrysler Corp. for the first quarter of this year were \$3,303,850 against a net loss of \$3,038,082 for the first quarter of 1933. Total current assets reported at the close of last March were \$98,951,014, with total liabilities of \$42,460,605.

A Swiss Packard

WASHINGTON—A car known as the Swiss Packard is being produced in Switzerland at present, being assembled partly from parts imported from the United States, according to the Department of Commerce. The work of assembling is being done by the well-known Swiss manufacturer of commercial vehicles, Saurer, in Arbon. Vehicles of this type were exhibited at the recent show in Geneva.

J. A. Waddell

Joseph A. Waddell, chief engineer of the Spencer Heater Company and in charge of sales for the company in the western district, died suddenly in St. Louis April 28, while in that city on business. He was 56 years old.

Hearings on 14 Product Codes to Be Held Soon

WASHINGTON—Public hearings are expected to be held at an early date on 14 product group supplements of fair trade practices to the APEM code. It is understood that differences of opinion as to how best to implement the provision in the master code barring sales below cost and requiring each product group in its supplement to set up a uniform cost accounting procedure to determine cost, has occasioned the delay in putting the supplement through.

A list of the supplements on which hearings are expected shortly, follows: Wheel and rim; carburetor manufacturing; automotive radiator manufacturing; automotive gasket manufacturing; spark plugs; oil filters; automotive electrical lighting and reflecting devices; valves; replacement pistons and pins; replacement automotive water pump and parts; piston rings; automotive shop equipment; metal bearings, and internal combustion engines.

Hearings were held some months ago on leaf spring and hot water heater supplements, but these as yet have not been approved.

Axle Shaft Supplement Is OK'd; Effective May 13

WASHINGTON—The replacement axle shaft supplement of fair trade practices to the master APEM code has been approved and becomes effective May 13. This is the first product group supplement to get NRA's final O.K.

Japan Industry Co.-GM Deal Nears Completion

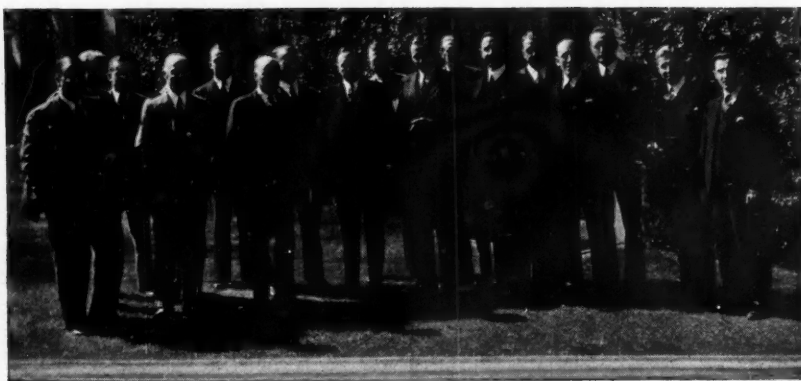
NEW YORK—Negotiations between the wealthy Japan Industry Company and the General Motors of Japan, Ltd., it is reported, have nearly reached completion whereby the former company will acquire 50 per cent of the stock of the General Motors organization.

Japan Industry owns an automobile parts plant at Yokohama which the deal is expected to link with the GM plant at Osaka. Business men of both nations view the deal as evidence of an increasing tendency by Japanese to absorb foreign enterprise.

Report Names Dreystadt Cadillac General Manager

NEW YORK—Nicholas Dreystadt has been appointed general manager of Cadillac, according to a report current here. For several years the post has been held by Lawrence P. Fisher, Cadillac president. The report states Mr. Fisher retains the presidency but, in addition, will become major assistant to W. S. Knudsen, executive vice-president.

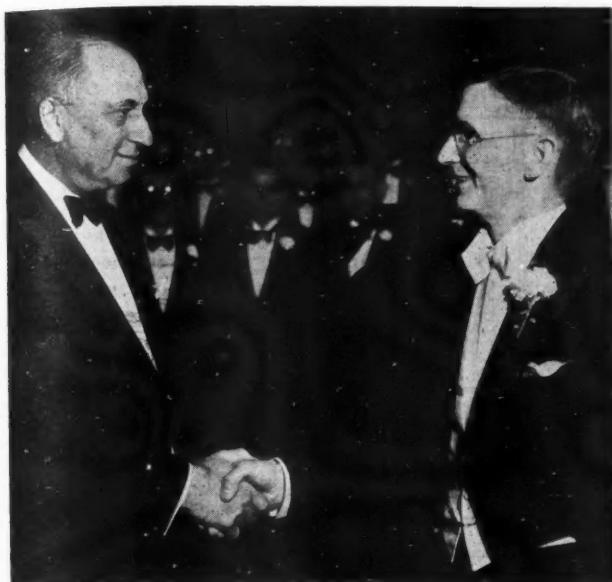
Bendix Host to S. A. E. Council



The S.A.E. Council enjoys the hospitality of past-president Vincent Bendix at his South Bend Home

May 12, 1934

Automotive Industries



Chrysler Congratulates Conductor

Thomas Lewis, director of America's largest industrial chorus greeted by corporation head. The choir of 185 voices is recruited from the four main divisions of the Chrysler organizations plants in Detroit

April Biggest GM Month Since 1931

Domestic Sales Soar To
106,349 — Dealer Stocks
Up 83,362 From January

NEW YORK—General Motors with April sales of 106,349 units to consumers in the United States and 121,964 units to dealers in this country, had the largest monthly volume it has enjoyed since May, 1931. World sales to dealers totaling 153,954 were the largest since April, 1931.

Domestic retail sales in April were 8 per cent ahead of March and 49 per cent ahead of April a year ago. For the first four months, total consumer purchases were 286,872 as compared with 211,968 in the similar period last year.

Sales to U. S. dealers increased to 121,964 from 119,858 in March and from 74,242 in April, 1933. The four-month total of dealer buying was 370,234 as compared with 241,826 last year.

Comparing sales to users with sales to dealers, the figures reflect an increase in domestic dealer stocks of 83,362 units from the exceedingly low levels existing at the first of the year. Last year, during the same period, stocks increased 29,858. The April increase in stocks amounted to 15,615 as compared with an expansion of 2643 units in the same month in 1933.

World sales to dealers numbered 153,954 in April as compared with 153,250 in March and 86,967 in April, 1933, the respective 1934 and 1933 four-month totals being 470,558 and 286,716.

Foreign sales in April reached the high figure of 20,201 units beating all monthly records except those registered in 1928 and 1929. The total represented an increase of 104 per cent over last year and lifted aggregate foreign business in the first four months to 59,817.

Dodge Truck Cuts Partly Offset April Increases

DETROIT—Price reductions ranging from \$10 to \$25 have been effected by Dodge Brothers on its truck lines. The reductions partially offset increases made early in April.

The new price schedules follow:

	Rating, Tons	Wheel- base	Chassis	Chassis and Cab
KC	1/2	111	\$385	\$480
KCL	1/2	119	415	510
K-32	1 1/2	136	545	640
K-33	1 1/2	148	575	670
K-34	1 1/2	161	575	670
K-45	2	140	870	975
K-46	2	157	890	995
K-47	2	169	900	1,005

New prices including bodies are as follows: On the KC, express \$500, sedan delivery \$595, canopy \$610, screen \$630; on the KCL, panel \$630; on the K-32, platform \$695, stake \$725; on the K-34, stake \$785; on the K-45, platform \$1,040, stake \$1,075; and on the K-47, platform \$1,100, stake, \$1,145.

Output Tapers, Stocking Ends

(Continued from page 569)

Although the decline in sales since the price increases has not been as sharp for the industry as a whole as claimed in some circles, it is highly unlikely that further general price increases will be made in view of the sales situation. As a matter of fact, during the past few days two manufacturers have moved in the opposite direction.

One of them has informed its distributors that on all cars they had in stock on May 1, they will be rebated to the price basis in effect prior to the April increases. These cars are to be retailed at pre-increase prices. In addition, Dodge, as noted elsewhere in this issue, has announced reductions on its trucks

which partially offset increases made last month.

Tool and die work on some of the 1935 models has been getting under way slowly in the last week or so with indications that the announcement season might possibly get under way as early as July this year. Unless new models are announced in late summer or early fall most sales managers believe price reductions may be necessary at that time to enable maintenance of reasonable production schedules and good clean-ups.

Smith M. Baits

DETROIT—Smith M. Baits, father of Stuart G. Baits, chief engineer of Hudson Motor Car Co., died at Cottage Hospital Wednesday. He was at one time a teacher of shop practice in the Industrial School for Boys at Lansing. Mr. Baits was 78 years of age. Besides his son he leaves a sister, Mrs. Halsey Toncray, and two grandchildren, Jane and Stephen Baits.

First Quarter's Statements

Vehicle Companies		1934	1933
8 companies reported.....		—\$4,275,507	— \$7,184,071
Stutz Motor Car Co.....		— 457,826	— 315,190
Chrysler Corp.....		+ 3,303,850	— 3,038,082
Mack Trucks		— 29,647	— 366,908
Total—11 companies.....		—\$1,459,130	—\$10,904,251
Other Automotive Companies			
28 companies reported		+\$2,166,641	— \$9,659,881
Borg-Warner Corp.....		+ 865,092	— 351,981
Motor Wheel Corp.....		+ 269,171	— 227,578
Chicago Pneumatic Tool Co.....		+ 24,761	— 187,539
Formica Insulation Co.....		+ 18,660	— 42,500
Briggs & Stratton Corp.....		+ 210,313	+ 1,324
Timken Roller Bearing Co.....		+ 1,278,199	— 276,000
Young Spring & Wire Corp.....		+ 311,883	+ 8,444
Campbell, Wyant & Cannon.....		+ 81,843	— 69,535
Gabriel Co.....		— 24,496	— 28,865
Hayes Body Corp.....		— 13,567	— 98,195
Outboard Motors Corp.....		— 70,095	— 122,572
Total—39 companies.....		+\$5,118,405	—\$11,082,875

One Champion Bowler Meets Another



Steve Preis bowls for a living but never has seen an alley. He works for Plymouth and all day long he rolls these 20-pound steel wheels across the factory floor to other workers who mount the tires. Here Steve is shown demonstrating his skill to Walter H. Reppenhagen world's bowling champion

Miss Perkins Urges Sliding Price Scale

Holds Production Might Be Stabilized by Selling Cars for Less in Summer and Fall

WASHINGTON—The need for some kind of stabilization in the automobile industry to eliminate the recurrent peaks and valleys in production was pointed out this week by Secretary of Labor Frances Perkins. She said that stabilization might be obtained if progressive prices were established on automobiles to encourage buying in the summer and fall and to lessen it in the normally active spring. Miss Perkins suggested that there should be no need for a plant working three shifts a day for a few months and then using only one shift the remainder of the year.

Her remarks on stabilization in the automobile industry were made in connection with a statement regarding conditions in Detroit for the first three months of this year as compared with the corresponding period of last year, the report being given as evidence that increased purchasing power starts the movement for improvement in general business.

Deliveries of passenger cars and trucks in Wayne county, in which Detroit is situated, showed a rise of 152 per cent, the report showed. The employment index for the Detroit area went up 142 per cent and automobile production disclosed a gain of 105 per cent.

"The percentage change in Detroit for the months of January, February and March, 1934, as compared with these three months of 1933 showed gains all along the business front," Miss Perkins said. "There was an increase of 766 per

cent in contracts awarded, most of these being construction work and thus stimulating to other industries."

The power consumption index, Miss Perkins stated, jumped 85 per cent while

Unjustified Strikes Cannot Paralyze Industry's Key Plants, Johnson Says

COLUMBUS—Apparently with recent strikes directed at key plants in the automotive industry in mind, in a speech delivered here May 4, General Johnson warned that the government would not stand idly by and permit precipitate action on the part of a few workers to tie up a major industry.

"Take a purely hypothetical case," he said. "Real recovery is under way at this moment. Suppose a substantial industrial pillar of it which activates more of the other industries than any single economic unit of the nation. . . . imagine some bottle-neck of production—some small plant department—the output of which controls the whole production of the industry. Let us assume that a few thousand workers in those single departments organized without reference to, or consultation with, the rest of the workers in the industry, demand wages far above any other wages and entirely inconsistent with the balanced wage-cost of the product. Not securing their demands, they strike and literally paralyze production throughout the industry."

"Does anybody suppose for one moment that the government is going to stand idly by and permit a few thousand men to precipitate such a result as that? Inviolable as is the right to strike, there

the revenues of the street railways from passenger fares increased 42 per cent. Freight cars loaded and received advanced by 42 per cent also and postal receipts registered a gain of 15 per cent.

GM Declares Dividends

NEW YORK—The directors of General Motors Corp. at their meeting this week declared on the outstanding common stock the regular quarterly dividend of \$.25 a share, payable June 12, 1934, to stockholders of record May 17, 1934.

In addition the regular quarterly dividend of \$1.25 a share was declared on the \$5 preferred stock.

Oldsmobile Employment Exceeding Peak of 1929

LANSING—Officials at the Oldsmobile factory in Lansing reported more unfilled orders on hand May 1 than during any previous month, in spite of the fact that production during April was over three times as large as last year.

The factory is now operating day and night on a double shift which calls for increased production during both May and June. Employment at the Oldsmobile plant has reached a new peak, even exceeding that of 1929.

is no right, however, sacred which in its exercise may not become an intolerable abuse of the rights of others."

Taken as a whole, the speech was a slashing attack on NRA's critics, and a spirited defense of its principles and possibilities. Fundamentally the General's objective appears to have been to build emotional, if not rational, support for the recovery program. As he did in Washington, a few nights previously, he said NIRA could not be enforced with penalties and policemen, and that it could succeed only with the cooperation of business and the public. To stimulate cooperation he urged that the public buy only under the "Blue Eagle," his remarks in this connection apparently being the opening gun in a new campaign to be launched officially within the next month or so, to revive public esteem for the famous bird.

In a demagogic attack on NRA's critics, he asserted in effect that they were inspired by motives that were sinister, selfish and partisan and, as a class, he charged them with being the group that was responsible for the depression. Referring to them, he said: "They are wealthy, powerful, and they do not scatter their shot. They all want just one thing, and they know exactly what they want—to scuttle the whole Recovery Program, make the Blue Eagle walk the plank, hoist the jolly Roger on the Ship of State, and sail back to the good old piracy that brought the crash of 1929 and all that has happened since."

Sharp Hourly Wage Increase Reported

APEM Records Show Rise Averages Approximately 22.08¢ Since Feb. 1933

DETROIT—The growth of employment in the automotive parts and equipment industry, as reported in *Automotive Industries* last week when APEM's report of 180,822 employees was issued, is more clearly shown by comparison of records for several months of 1933.

February employment last year was 72,800 workers; June, 110,350, and August, 150,274. Spreading out of the hours worked weekly during the current year is largely responsible for the increased employment. The average hours per week in 1929 was 54, and during March of this year the average was only 40 hours per week.

There has been an even sharper increase in the average hourly wage paid by the industry, since last year. In February, 1933, the figure stood at 42 cents per hour. In March of this year it had risen to 64.8, an increase of better than 50 per cent. It will be noted that in comparison with February of last year this represents a large net gain in average weekly earnings, the figures showing an average weekly wage for last February of \$19.60, as compared with \$25.90 for March of this year.

C. H. Nehls New Engineer at Yale and Towne Plant

DETROIT—Yale & Towne Manufacturing Company has appointed C. H. Nehls chief engineer of its Detroit plant. Mr. Nehls was formerly with the Eaton-Detroit Metal Company.

No Signs of More Bank Credit Available To Dealers In Face of Rising Car Sales

WASHINGTON—Neither rising car sales nor mounting reserves are increasing the amount of bank credit available to automobile dealers. In fact statistics of automobile financing for the first quarter, released this week by the Census Bureau, indicate that dealers are depending more than ever on floor plan financing to carry inventories.

During the first three months of the current year, wholesale financing increased 134 per cent over the corresponding 1933 period as compared with a 59 per cent gain in retail sales. Although dealer inventories increased somewhat more than sales during this period, nevertheless the figures indicate that the industry's dealers are using relatively less bank credit than a year ago.

The number of new units financed at retail was 61 per cent greater in the first quarter than in 1933, this increase closely paralleling the improvement in sales, which, as previously stated, amounted to 59 per cent. The correlation between these two increases tends to disprove a rather widely circulated statement that cash sales are accounting for an increasing proportion of total volume. Such a tendency, if it existed, would have serious implications, because it would indicate that wage earners were

losing confidence in the continuity of their income. Further proof that percentage of time sales is not decreasing is provided by a study by the N.A.F.C. which shows that trend has been a rising one for over a year.

Assuming no change in finance company credit policies with respect to down payments, an increase in the average new car note from \$513 in the first quarter of last year to \$552 this year, indicates that the public is paying an average of about 7.5 per cent more for its new cars. On the other hand, the average used car note shows practically no change—\$224 this year against \$222 in 1933. This indicates that used cars are selling on the average at about the same level as last year and, after deducting, from selling prices the percentages required by the dealer code, suggests that allowances are averaging somewhat less than last year. The combination of higher new car prices and lower used car allowances, therefore, is possibly having the result of increasing "real" new car prices to the customer by 10 per cent as a rough estimate.

The following table gives detailed comparative data reflecting the substantial gains which improving sales have wrought in automobile financing:

	March 1934	Feb. 1934	March 1933	Three Months 1934	Three Months 1933
Wholesale	\$102,760,116	\$61,513,896	\$27,706,336	\$200,153,076	\$85,354,905
Retail New Car					
Units	84,397	52,772	38,329	171,595	106,484
Dollars	\$46,234,509	\$29,290,038	\$19,463,540	\$94,714,283	\$54,623,585
Average Note	548	555	508	552	513
Retail Used Car					
Units	95,260	68,830	60,625	228,665	167,655
Dollars	\$21,489,605	\$15,197,698	\$13,335,403	\$51,107,735	\$37,234,399
Average Note	226	221	220	224	222

Kettering Tells a Story

CHARLES F. KETTERING, General Motors vice-president, told the following story during his address at the Transportation Department luncheon during the annual meeting of the United States Chamber of Commerce.

"An American philanthropist went over to Europe, and he took seriously ill in Scotland. He had to go to a hospital, and in the course of things he had to have a blood transfusion. So he had a blood transfusion, and he got better right away, and he felt so well about it that he gave the donor of the blood \$100, which was a high price in Scotland, or any other country.

"In about two weeks after he had to have another transfusion, and that helped him a lot, too, and at that time he gave the Scotchman \$50, because he had been admonished that \$100 was too much. About two weeks after he had to have another blood transfusion. By that time he had so much Scotch blood in him he just thanked the fellow."

W. R. Huber Joins Staff Of Getchell Adv. Agency

DETROIT—W. R. Huber, who for the past 15 years has been connected with the General Motors Corp., has joined J. Stirling Getchell, Inc.

Mr. Huber will be located in the Detroit office of the agency. He was at one time general sales manager of the Delco Light Company, later director of sales promotion of Buick-Olds-Pontiac Sales Company, and more recently sales promotion manager of Pontiac.

Indianapolis Referee



Roy D. Chapin, Hudson president and former Secretary of Commerce, who will be in charge of the annual automobile classic Memorial Day

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

Most business reports from various centers throughout the country last week were favorable. The level of activity in the major industries was well above that a year ago, with the best showing made by the steel and automobile branches. Further gains were made in retail trade, although the improvement was retarded somewhat by the unfavorable weather. Wholesale trade, however, was on a smaller scale.

Greater Car Loadings

Railway freight loadings during the week ended April 28 increased, but the percentage gain was less than that during the preceding week. The total was 608,000 cars, which marks an increase of 19,201 cars above that during the week before, an increase of 69,845 cars above that a year ago, and an increase of 54,457 cars above that two years ago.

Increased Current Output

Production of electricity by the electric light and power industry in the United States during the week ended April 28 was 16.8 per cent above that in the corresponding period last year.

Lumber Production Healthy

Lumber orders booked at the mills during the week ended April 28 were smaller than those during the preceding week but were larger than those during any of the weeks in

the first two months of this year. Production was below the level of the preceding week, but was 45 per cent above that a year ago.

Oil Production Up

Average daily crude oil production during the week ended April 28 amounted to 2,450,250 barrels, as against 2,431,100 barrels for the preceding week and 2,383,100 barrels for a year ago. The current figure is 84,050 barrels above the Federal allowable figure.

Bituminous Coal Steady

Production of bituminous coal during the week ended April 21 amounted to 5,887,000 tons, which is approximately the same as the figure for the preceding week, and compares with 4,634,000 tons a year ago.

Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended May 5 stood at 74.0, as against 73.1 the week before and 73.2 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended May 2 shows decreases of \$2,000,000 in both holdings of bills bought in the open market and holdings of discounted bills. Holdings of Government securities increased \$2,000,000.

Reciprocal Bargaining Gets N.A.C.C. Approval

WASHINGTON—The National Automobile Chamber of Commerce urged approval of the reciprocal tariff policy proposed by President Roosevelt in bill H.R. 8687, in a brief filed last week with the Senate Committee on Finance.

From a record low of 181,000 motor vehicles sold outside the United States in 1932 the brief pointed out, there was an increase to 240,000 units in 1933. During the first quarter of 1934 there has been an encouraging improvement over the same period last year, but the volume

is still far short of normal. However, with the aid of President Roosevelt's tariff policy, this market might well reach the half million mark next year with far-reaching effect on employment and purchasing power. Beyond the sale of this half-million cars in prospect for 1935, the sale abroad of as many as a million American cars in a single year is not beyond the realm of possibility, given a reasonable tariff policy.

The brief, which was signed by Robert C. Graham, chairman of the Chamber's export committee, had appended to its schedules showing tariff and quota restrictions effective in leading countries.

Rules Governing NRA Code Changes Issued By Johnson

WASHINGTON—Rules and regulations governing amendments, modifications, stays, exceptions and exemptions from approved codes were issued during the week by General Johnson. The order was issued in three sections.

The first section defines modifications as including "amendments and all rulings whereby a code is amended by adding a provision thereto, or changing or omitting any provisions thereof"; the second part covers exemptions including "exceptions and stays and all rulings whereby an individual group or class is released from the full operation of a provision of a code," and the third section concerns code authorities, including "any analogous agency, and the term 'Administration Member' shall mean the member or members of the code authority representing the Administrator."

Under the terms of the order Administrator still retains all rights and prerogatives of approving or disapproving all proposals for actions upon codes as covered by the order.

White Publishes Issue of "Time"

CLEVELAND—Patterned along the lines of the popular weekly magazine *Time*, the White Co. has just issued a unique promotional piece which presents its story in the style of its prototype. The text is profusely illustrated and is presented in departments including National Affairs, Foreign News, Business & Finance, White Trucks in the News, Your Affairs, Internal Affairs, Bus Transportation, Science, Medicine, Service, Press, Education, Cinema, Miscellany and Quiz.

Ford Taking Detroit Orchestra to Chicago

DETROIT—The Ford Motor Company has engaged the Detroit Symphony Orchestra to play at the Ford exhibit at the Century of Progress Exposition, Chicago, this summer. Two concerts will be given each day for 12 consecutive weeks.

Victor Kolar, associate director of the orchestra, will conduct the programs, which will be played in an especially constructed shell in the gardens of the Ford building.

Willys-Overland Co. Resumes Operations

TOLEDO—Operations at the Willys-Overland Co. here were under way again Monday after a week's layoff to accumulate parts. About 3,000 workers are on the payroll when production is in full swing.

Ford Dealer Takes NRA Bid Issue to D.C. Court

WASHINGTON—Suit was filed this week in the District Supreme Court by the Northwest Motor Co., Bethesda, Md., Ford dealer, to enjoin Secretary of War Dern from rejecting the company's bid on 19 motor trucks. The War Department turned the bids down because the Northwest Motor Co. could not produce a Ford Motor Co. certificate of compliance with the NRA code. The Northwest bid, submitted April 5, were the lowest but on May 2, the petition said, the company received a letter from the office of the Quartermaster General asking for a certificate of compliance from the Ford Motor Co. The Northwest Motor Co. said it wrote to the Ford company asking for a certificate but received no reply.

The Quartermaster General's letter also said, the petition stated, that the Northwest Motor Co. could request an exception, and this was sought by the company through the War Department but it was stated that no such application was made by the Department to the NRA.

Baltimore S.A.E. Section Elects Froesch Chairman

BALTIMORE—Charles Froesch, sales and service engineer of the General Aviation Manufacturing Corporation, was elected chairman of the Baltimore Section of the Society of Automotive Engineers at the annual meeting held at the Engineers Club on May 3. Col. James

Indexes of M.E.M.A. Member Shipments

(January, 1925 = 100)

	Mar. 1934	Feb. 1934	Mar. 1933
Total Shipment	141	106	41
Original Equipment	150	109	33
Service Parts	139	118	87
Accessories	73	65	42
Service Equipment	72	59	32

R. Hill, assistant commandant at Camp Holabird, was named vice-chairman. Robert C. Hall, engineering aide of the Baltimore Coach Company, was elected treasurer. Espy W. H. Williams, chief statistician of the Automotive Trades Alliance, was elected secretary for his fourth consecutive term.

Among the speakers at the meeting were Joseph Geschelin, Engineering Editor of *Automotive Industries*, who spoke on "Trends and Future Developments in Truck Design," and Walter Paul, New York, whose subject was "The Art of Welding."

20 Four-Cylinder Cars Enter Indianapolis 500

INDIANAPOLIS—Entries for the Memorial Day 500-Mile Race total 53 cars, of which 33 will be permitted to start. The cars entered include 29 eights, 20 fours, three sixteens and one six. There are eight front drives and two driving all four wheels.

Consumer Advantage Cited In Steel Code

Current Automotive Steel Specifications No Consumption Gauge

NEW YORK—Specifications coming to steel mills from automotive consumers furnish little information as to what proportion of steel is being ordered shipped against current and nearby requirements, and what tonnage can properly be assumed to be intended for stocking as a nest-egg for the third quarter. Some steel company sales managers are of the opinion that all of the rise in this week's rate of operations, amounting to more than 2 per cent, is due to stocking by consumers. Others are inclined to minimize the extent of specifying for that purpose.

Flat steel producers have to keep on reminding customers with steel due them on contracts at former prices that it is to their advantage to furnish specifications as promptly as possible, so that shipments, in accordance with Code provisions, can be completed by June 30. If there were danger of stocking seriously undermining fresh third-quarter buying, somewhat less energy would probably be expended in prodding consumers to take steel coming to them now.

Extension of the life of the steel industry's code was forecast by inference in an address by Walter S. Tower, executive secretary of the American Iron and Steel Institute, when he listed the advantages derived by steel producers and workers from code regulation. From the steel consumer's and buyer's point of view, the code has had one outstanding advantage.

Since Nov. 6, 1933, steel demand has increased more than 125 per cent. Without the price control features of the code, so marked an acceleration of the demand in the short space of six months might have been fraught with grave danger of runaway market conditions. Taking it all in all, steel makers contend, the rise in steel prices under code regulation has been moderate and gradual, a condition that under the previously prevailing marketing methods, it is admitted by some steel buyers, could hardly have been attained amid so sharp a rise of demand.

Aluminum—Code regulations make for steadiness in the market for secondary metal. The bulk of demand continues to come from automotive consumers. The virgin ingot market is unchanged within a range of 19 at 23.30 cents, according to degree of purity. Remelted No. 12 alloy is quoted at 14½ at 16 cents, according to grade.

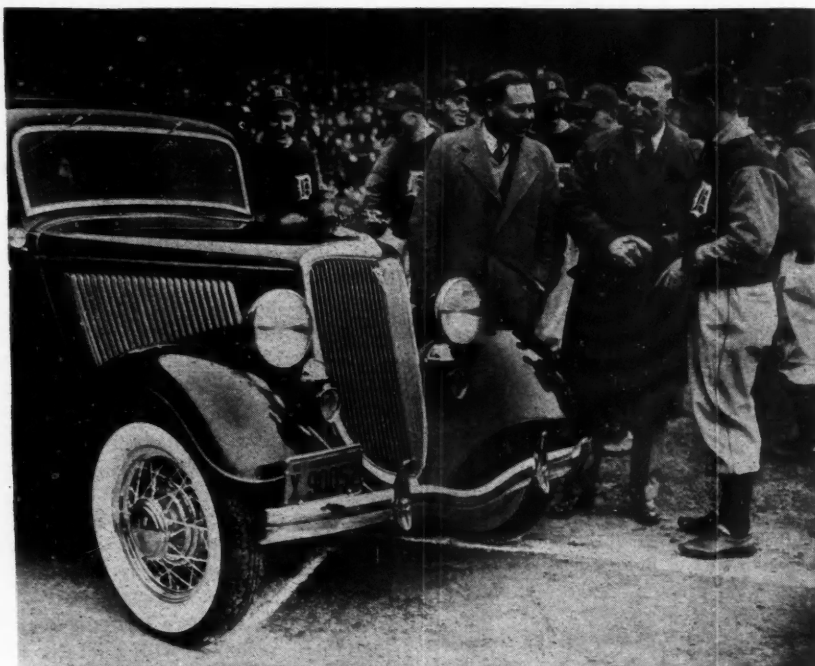
Copper—The Copper Code Authority continues to wrestle with the problem of sales quotas for custom smelters and producers of secondary copper. NRA Deputy Administrator Harry O. King has requested that all inquiry for non-Blue Eagle copper be reported. The quotation for Blue Eagle copper continues at 8½ cents, delivered Connecticut Valley point.

Salient Automotive Financial Facts

(Based on consolidation of income statements and balance sheets of General Motors, Chrysler, Auburn, Graham, Hudson, Hupp, Mack, Nash, Packard, Reo and White, which producers in 1933 accounted for 70 per cent of U. S. sales.)

	1929	Per Cent of 1920			1933
		1930	1931	1932	
U. S. Car and Truck Sales	100	63	56	34	50
Sales in Dollars	100	61	49	28	37
Net Income After Charges	100	50	25	Def.	23
Dividends	100	82	71	33	30
Cash and Securities	100	116	125	105	101
Inventories	100	72	54	40	57
Current Assets	100	90	84	67	72
Current Liabilities	100	65	61	46	60
Working Capital	100	99	91	74	75
Plant and Property Depreciated	100	94	86	77	72
Net Worth Less Good Will, Etc.	100	98	91	81	81
Per Cent Earned On Net Worth	24	12	7	Def.	7
Working Capital As Per Cent of Net Worth	39	40	40	36	36
Current Ratio	3.9	5.3	5.3	5.7	4.6

For detailed analysis see article beginning on page 589 of this issue.



Mickey Cochrane, manager of the Detroit American League team, receives a Ford V-8, before a big crowd of fans in automotive capital. From left to right the photo shows Harry Mack, manager of the Ford Motor Co., Dearborn branch; W. C. Cowling, Ford general sales manager, and Cochrane

of one of the steel blades but the defect was not pronounced enough to be considered definitely as the primary cause of the failure, it was stated.

All of the fractures in the completely failed blades originated as fatigue cracks which progressed under the action of vibratory stresses until enough of the section was severed so that the remaining sound metal could not support the normal service stresses and failed suddenly, Mr. Rawdon stated.

New Car Design Subject Of SAE Section Meeting

NEW YORK—One of the most unusual meetings ever staged by an S.A.E. Section is scheduled by the Metropolitan Section for May 17. An afternoon demonstration at which all the latest cars will be put through their paces will precede the evening meeting. At the demonstration, members of the section will be permitted to drive or ride in each of the new cars to be lent by dealers. Following the demonstration the usual dinner and meeting will take place at 40 E. 41st Street, with Austin Wolf presenting a paper entitled, "A Critical Study of Passenger Car Design and Performance."

GM to Add 300 Workers At Two Canadian Plants

OSHAWA, ONT.—A separate assembly line for trucks and commercial cars, requiring the employment of an additional 150 men, is being set up in the local General Motors of Canada, Ltd., according to a recent announcement by H. A. Brown, vice-president and general manager. Expansion plans under way at the Walkerville plant also call for the employment of another 150 workers.

Heretofore truck assembly work was handled by the same force that assembles passenger cars. Increase in General Motors truck and commercial car sales is responsible for the expansion program. Sales of these vehicles for the first quarter of this year were 77 per cent over the same period for 1933.

Study Shows Vibrations Cause Propeller Failures

WASHINGTON—Previous conclusions as to the importance of vibration in causing failure of airplane propeller blades are confirmed by recent studies at the National Bureau of Standards, according to H. S. Rawdon, chief of the Bureau's metallurgical division.

Within the past few months metallurgical examinations have been made on nine blades which were cracked or broken in actual service to determine

whether the failures could be attributed to defective material. Six of the propellers were aluminum alloy and three were hollow welded steel.

Defective material was found in only one of the aluminum alloy blades, and this defect had been discovered before complete failure of the blade. A defect in the weld was found in the fracture

Graham Stockholders OK Exchange of Stock Plan

DETROIT—Stockholders of Graham Paige Co. Monday approved company's plan for exchange of 7 per cent preferred for common stock on basis of 12 common for one preferred.

CALENDAR OF COMING EVENTS

SHOWS

American Transit Assoc., Cleveland, Ohio	Sept. 22-27
Cleveland (Automotive Service Industries)	Nov. 19-23

MEETINGS

American Petroleum Institute, Pittsburgh	May 22-24
National Street and Highway Safety Conference, Washington D. C.	May 23-25
S.A.E. Summer Meeting, Saranac Lake, N. Y.	June 17-22
American Society for Testing Materials, Atlantic City, N. J.	June 25-29
American Chemical Society, Cleveland, Ohio	Sept. 10-14
American Welding Society, New York City	Oct. 1-5

RACES

Indianapolis	May 30
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ANNUAL MEETINGS

National Battery Mfrs. Assoc., Cleveland, O.	May 16-18
Natl. Automobile Chamber of Commerce, New York, N. Y.	June 7
American Electro Platers Soc., Detroit	June 11-14
Natl. Assoc. of Motor Bus Operators, Cleveland	Sept. 21-22
Natl. Safety Council, Cleveland, O.	Oct. 1-5

CONVENTIONS

National Machine Tool Builders Assoc., Chicago	May 24-25
American Society for Metals, New York City	Oct. 1-5
American Transit Assoc., Cleveland	Sept. 24-27
International Foundry Congress, Philadelphia	Oct. 22-26
American Foundrymen's Assoc., Philadelphia	Oct. 22-26
National Foreign Trade Council, New York	Oct. 31-Nov. 2

EXPOSITION

Natl. Exposition of Power & Mechanical Engineering (Biennial) New York, N. Y.	Dec. 3-8
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But Where Does the Customer Come In?

A BUSINESS man who visited Washington recently told of being driven to five hotels before he found one that could give him shelter. He was there, of course, on NRA affairs; and to him, as to the thousands of others whom like business has been taking there, Washington looks nowadays like the only boom town in America. Certainly the recovery activities have put the Capitol City's hotel business strictly on the map—at good per diem rates.

Consider next the expense of regional, state, country, and strictly local meetings of business people all over the country to arrange for compliance with codes, administrations, commissions and authorities, all directed to industrial recovery. Estimate, if it is possible, the value of the time which business men have had to give these matters. Calculate the measure of disturbance and disorganization in thousands of establishments that has resulted from this preoccupation of business leadership, for in all this *so-called* recovery movement the Government expects to deal only with the chief executives and leaders of business. Contemplate the bulge in lower-berth Pullman business, and the upper-berth strain on tempers and dispositions, incident to all the tearing around. Weigh up the accumulated exasperation consequent on delays, postponements and indecisions of authorities vested with new and unfamiliar duties. Ponder the profligacy of paper work—questionnaires, abstracts, reports, audits, surveys—that has been demanded from harassed clerical and accounting forces.

The sum of all these things, if it could be set down in figures, would mildly suggest the bill that somebody has got to pay. Probably, however, even that grand total would be unimportant as compared to the demoralizing effect of maddening uncertainties, disrupted routines, and frankly experimental forays into unexplored territories of business supervision. To all this would have to be added an accounting for the army of functionaries that has been attached to Government payrolls everywhere; and in this connection it must be kept in mind that there are no affections more ardent, no attachments more devoted, than that of the Government pay-roller for the

Government payroll. Sea-going ships are said to rid themselves of barnacles by a brief sojourn in fresh waters; but the ship of state is now loaded so deep that there are apparently no fresh waters she can enter.

Some day, of course, the bill for all this will be presented to Mr. Ultimate Consumer. He is everybody; about 126,000,000 of him. He is the luckless wight who will finally have to cough up, and he begins to wonder whether it will make him strangle.

It is time to ask whether in the maze of regulatory projects any real thought has been given, any effective planning done, in behalf of the consumer. Any program that boosts labor and capital one rung up the ladder, but that pulls the consumer down two rungs, is going to be bad medicine; for the consumer is both labor and capital—all of labor and all of capital. And there is getting to be an ingrowing notion in the popular mind that progress up the prosperity ladder is being made in about this way.

There are a lot of people who cannot conceivably benefit by the recovery activities. But as consumers they can all suffer from the imposition that these activities lay on them. As they get no one-rung boost up the ladder, the net effect for them is a drop of two rungs. That is bound to mean a bump, and this sort of bump is sure to be painful just when the victim finds himself on the way to the polls. If at that time consumers in general find themselves rubbing their bumps, the politicians will find themselves seeking treatment for permanent dislocations.

The apprehension gains ground, that a lot of class legislation and class regulation is being imposed, which is hurting the average citizen more in his capacity as a consumer than it is helping him as a member of a particular class. And it is one of the hopeful signs that consumers are definitely beginning to realize this. Let this big idea once get firmly lodged in the mind of the consuming community, and it will very presently get across also to the politicians. About that time we may hope for some relaxation of zeal in behalf of the series of Great Experiments now going on.

Buick Enters New Market with

Car closely resembles larger models in design and appearance—93 hp. engine combined with weight savings give unusually good performance

THERE is a strong family resemblance between the new 40 series, Buick's latest "low-medium-priced" production, which is being announced to the public today, and the original Buick line for 1934. Having a 117-in. wheelbase, it is 2 in. shorter than the Buick 50, and being also somewhat narrower and slightly lower, the same lines could be retained from the narrower radiator grille back.

From the performance standpoint, however, the car represents a marked advance. It has a greater feeling of liveliness, and its maximum speed also is greater than that of the 50. This increase in performance has been achieved by the use of an engine of high specific output and by weight reductions in both engine and chassis. Outwardly there is little ocular evidence of weight reductions, either in the car as a whole or even in the chassis, but the 40 is 700 lb. lighter than the 50, and the saving in weight evidently was accomplished by lightening castings, forgings and pressings throughout the car wherever possible.

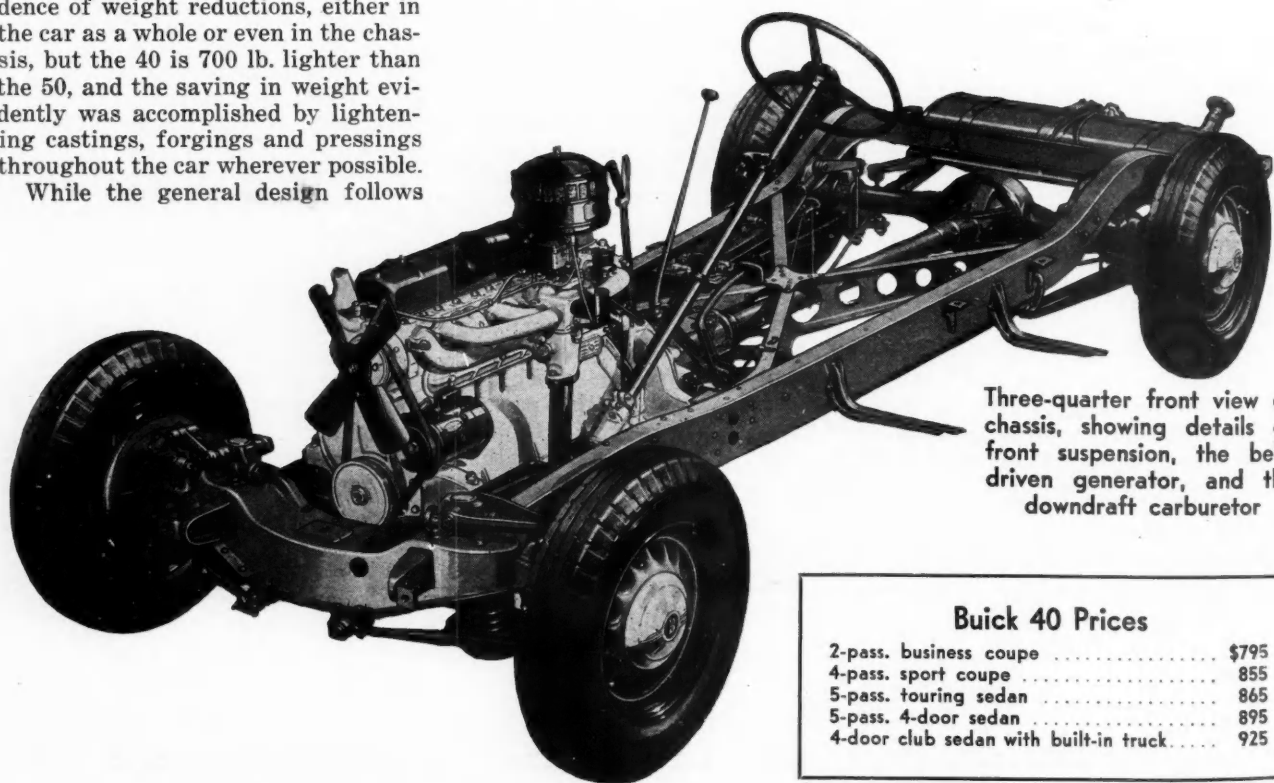
While the general design follows

that of the Buick 1934 line rather closely, there are some noteworthy differences. For instance, the front end has been redesigned in detail, which has materially simplified the manufacturing processes and incidentally resulted in a saving of 15 lb. in the front unsprung weight.

Adoption of a type of connecting rod in which the big end is split at an angle of 45 deg. to the shank has made it possible to remove the pistons from the top of the block, and at the same time has reduced the height of the block by 3 in., which, of course, means an important saving in weight. This lowering of the block, together with the necessity of preventing interference between the steering gear and the intake system,

has led to the adoption of the downdraft carburetor—a departure in Buick practice. The carburetor, moreover, is a dual, plain-tube Marvel, a further innovation for Buick. A reduction in engine weight has been achieved also by using a stamped cover for the camshaft-drive housing, the drive now being by chain instead of by gear. The generator is belt-driven on this model.

A new automatic choke, of Delco-Remy production and said to be of simpler design, is fitted. There are several other minor points of difference between the new 40 and the other engines in current Buick productions, but on the whole it follows the same lines. Engine mountings are of the same type but appear



Three-quarter front view of chassis, showing details of front suspension, the belt-driven generator, and the downdraft carburetor

Buick 40 Prices

2-pass. business coupe	\$795
4-pass. sport coupe	855
5-pass. touring sedan	865
5-pass. 4-door sedan	895
4-door club sedan with built-in truck	925

"8" at \$795 to \$925

by Athel F. Denham

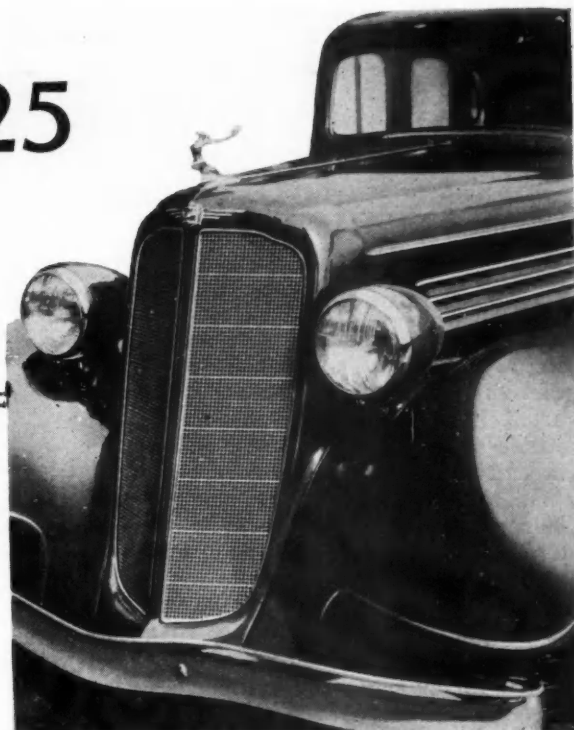
Detroit Editor, Automotive Industries

Specifications of Buick Series 40

No. of cylinders, 8.
Bore and stroke, $3\frac{3}{32}$ by $3\frac{1}{8}$ in.
Piston displacement, 233 cu. in.
Max. horse power, 93 at 3200 r.p.m.
Compression ratio, 5.45.
Compression pressure, 100 lb. per sq. in. at 135 r.p.m.
121 lb. per sq. in. at 1000 r.p.m.
Piston material, cast iron.
Weight of piston, 26 oz.
Weight of piston, with rings, pin and bushings, 32.8 oz.
No. and width of compression rings, two $\frac{1}{8}$ in.
No. and width of oil rings, two $\frac{5}{32}$ in.
Piston pin diameter, $1\frac{1}{16}$ in.
Piston pin length, $2\frac{1}{16}$ in.
Connecting rod length, $7\frac{1}{4}$ in.
Crankpin bearing, 2 by $1\frac{1}{4}$ in.
No. of crankshaft bearings, five.
Main bearing diameters and lengths:
No. 1, $2\frac{5}{16}$ by $1\frac{1}{4}$.
No. 2, $2\frac{3}{8}$ by $1\frac{5}{16}$.
No. 3, $2\frac{7}{16}$ by $1\frac{1}{8}$.
No. 4, $2\frac{1}{2}$ by $1\frac{15}{16}$.
No. 5, $2\frac{9}{16}$ by $2\frac{1}{16}$.
Timing chain make, Morse.
Dimensions of chain, 49 links, $\frac{1}{2}$ in. pitch, 1 in. width.
Inlet valve material, nickel-chromium steel.
Exhaust valve material, Silchrome No. 1.
Inlet valve outside diameter, $1\frac{1}{32}$ in.
Exhaust valve outside diameter, $1\frac{1}{32}$ in.
Valve lift, 0.334-0.339 in.
Valve timing:
Intake opens $4\frac{1}{2}$ deg. b. t. c., closes 54 deg. p. b. c.
Exhaust opens $57\frac{1}{2}$ deg. b. b. c.; closes 21 deg. p. t. c.
Chassis lubrication, Zerk pressure gun.
Crankcase ventilated.
Carburetor, Marvel 1 in. downdraft dual.
Heat control automatic.
Choke, Delco-Remy automatic.
Water pump drive, by belt from crankshaft pulley.
Ignition system, Delco-Remy.
Battery, Delco 100 amp. hrs.
Starter, Delco-Remy.
Starter drive ratio, 16.32.
Generator drive, belt off crankshaft pulley.
Maximum charging rate, cold, 16-18 amps.
Clutch, own make, single disk, dry, $9\frac{1}{8}$ in.
Transmission, own make, three-speed, constant-mesh, all-helical, with synchronizing clutches.
Universal joints, own make, metallic type.
Drive and torque taken through torque tube.
Rear axle, semi-floating.
Rear axle ratio, 4.33.
Tires, 16.00/6.25.
Wheels, demountable, steel-spoked.
Spring shackle, threaded-bolt type.
Steering gear, Saginaw worm and double roller.
Service brakes, Bendix four-wheel mechanical.
Emergency brakes, four-wheel.
Total braking area, 182 sq. in.
Braking-effort distribution, 50/50.
Frame side-rail max. section, $5\frac{1}{2}$ by $2\frac{1}{4}$ by $\frac{1}{8}$ in.
Wheelbase, 117 in.
Tread, $57\frac{1}{2}$ in. both front and rear.
Shipping weight of 5-pass. sedan, 3155 lb.

Factory Performance Statements

Top speed	85 m.p.h.
Acceleration, 10 to 60 mi.	21 sec.
Fuel economy at 55 m.p.h.	15 mi. per gal.



The frontal appearance is very similar to that of the larger Buicks

Sectional drawings of the engine and the front-end design were received too late to permit of making cuts for use in this issue. These illustrations will appear in next week's issue of Automotive Industries.

oped. The triangular sub-plate secured to the bottom of the front cross member has been eliminated and the lower wishbones of the parallel suspension are now mounted on a continuous shaft each. These shafts, which are threaded at each end for the bearing of the wishbone arms, are bolted to the box-section front cross member from below.

At the outer ends of the wishbone links the separate steering-knuckle support-arm yoke has been dropped, to simplify the construction. While this eliminates the adjustment for camber, it permits the provision of a really simple caster adjustment.

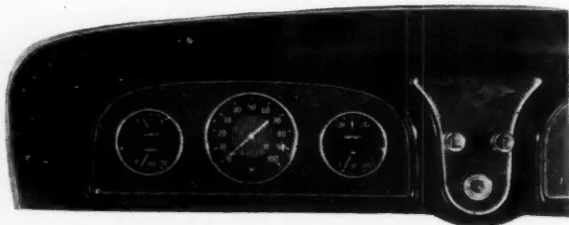
With the dropping of the triangular sub cross member, the intermediate steering arm is now carried on a forged bracket bolted to the rear of the front cross member. As on the other Buicks, the intermediate arm is carried in ball bearings, slightly pre-loaded in assembly.

From an assembly standpoint the

to be somewhat livelier than in the larger cars, which tends to offset the somewhat lower degree of engine smoothness as compared with the larger cars. The accompanying

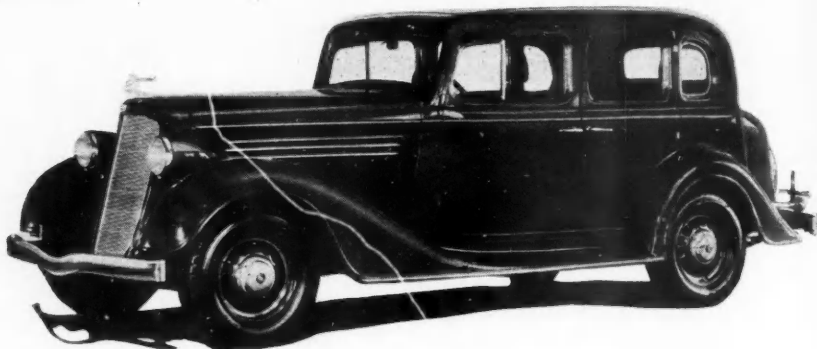
specifications give a rather complete picture of the design.

Of particular interest is the way in which the front independent suspension system has been further devel-



Simplicity is the keynote of the instrument-panel design

Buick Series 40 with four-door club-sedan body and built-in trunk



entire design has definite advantages. The entire front suspension, including shock absorbers on the top arms, and supporting shafts on the lower arms, is assembled on jigs and adjusted for camber and caster before assembly on the car itself.

In order to be sure that fits will be correct and alignment will not be disturbed in assembly, the frame members are not drilled to take the front assembly until after the entire frame has been assembled. Then all bolt holes are simultaneously jig-drilled at the beginning of the chassis-assembly line, using an overhead, multiple-spindle drill press. This makes it unnecessary to go through the tedious wheel-alignment checks and adjustments, at the end of the assembly line, which frequently cause delays in production.

Another change worth noting is that the rubber compression-control bumper is not located inside the coil spring but is fastened to the outer end of the front cross member, from below. Owing to the greater lever arm through which this bumper acts, it can be made of a softer rubber.

The front cross member itself is both riveted and welded to the side rails. The front shock absorbers on this model do not incorporate the inertia valves, and they give proportionally less control on compression than on rebound, which indicates a well-balanced suspension system. The rear shock absorbers are of the single-acting type.

Clutch, transmission, torque-tube drive, axle and frame follow established Buick design rather closely, although the dimensions of these parts differ from those of corresponding parts of the larger Buicks. The braking system is also generally the same as on the other models but the vacuum servo is not included in the standard equipment of the 40. At the rear of the frame there is a somewhat simpler ride stabilizer.

Interior features include such items as wide-pleat upholstery, a simple three-dial instrument panel, balanced by a wide glove box, etc. Tan leather upholstery is available on each model at extra cost.

Other features of the new Buick 40 include the following:

Engine:

- Lower stroke/bore ratio (1.25).
- Compression ratio (5.45) relatively high for a valve-in-head engine
- High specific power output (0.40 hp. per cu. in.)
- Average fuel mileage, 15 per gal.

Fuel mileage at 70 m.p.h., 13 per gal.

Counterweighted crankshaft with balancer and overlapping journals.

Dual valve springs

One-piece valves

Copper-plated lifter rollers and pins

Crankcase ventilation

By-pass-type cooling thermostat

Automatic heat control

Intake silencer and air cleaner combined

Vacuum spark control

Solenoid starter switch with mechanical shift automatic, operating through accelerator pedal

Octane selector

Chassis:

All-helical transmission with synchromesh

"Air cushion" lower pressure tires (26 lb.)

Anti-friction steering gear—worm and roller

Duo-servo brakes with emergency cutting in on all four wheels

Brake operation through cables with grease packed flexible conduits between frame and wheels

Carbon-manganese steel brake drums

X-type frame with side rails projecting through the front cross-member

Unit mounting of radiator and fenders

Bodies:

Latest no-draft ventilation

Three-beam headlighting (including country passing beam)

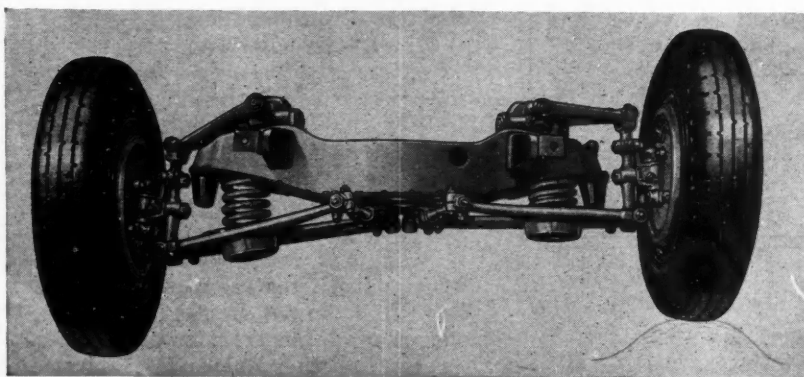
Steel artillery wheels

Reversed cowl ventilator

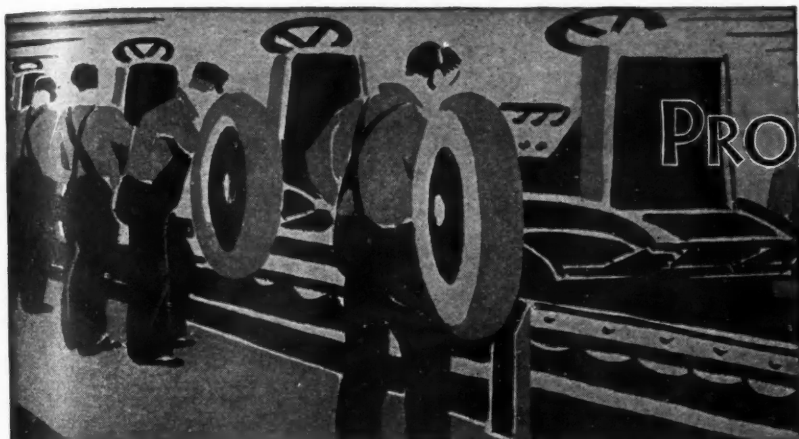
Bonderized sheet metal

Dash gasoline gage and temperature indicator

All models wired for radio



The independent front suspension remains the same in principle but has been simplified in design



PRODUCTION LINES

Big Output

As has been noted recently Hudson did an outstanding job in meeting the demand for greater generator capacity on radio-equipped cars. The problem was met with the new Auto-Lite generator, fan cooled and oversized. Some 50,000 of these units have been installed on Hudson and Terraplane cars in current production.

Joins Ranks

What with the growing development of Diesel engines in this country, we learn that another ignition manufacturer will soon announce a Diesel fuel injection system. The way things are moving there should be plenty of room for some competition in this fertile field.

Patent Tip

If you are looking for patentable features in your product listen to the advice of one who has clinched many claims. This man told us the other day—"The best patent is one that covers the unavoidable feature of the construction." Thus if some peculiar phenomenon attends the construction or if the design can be worked out in only one way, an unavoidable characteristic, that's the thing to patent.

Fay Automatics Fin Wright Cylinders

Through an oversight Fig. 1 and Fig. 2 were incorrectly captioned in the article, "Centralized Tool Departments Assure Keener Cutting Edges at Tool Points" which was published in *Automotive Industries*, April 28, 1934. Wright cylinders are finned on Fay (J & L) automatics and not P & J machines as captioned. This correction also applies to the description of the finning department tool crib on page 526. Please note this on your file copy.

An Orchid

Incidentally, if you are looking for an outstanding speaker with the gift of humanizing the purely scientific, take our tip and induce Col. Ragsdale of Budd, to take the assignment. He has a downright gift for making understandable the most abstruse scientific problems and dishing it up with fine subtle humor. Besides, he is the expert on shot welding, high-tensile steels, streamlining and a few other things.

By Chilling

Press fits for valve inserts now being accomplished by chilling instead of heavy pressures, in many engine plants. Some use dry-ice, which reduces the temperature to about—100 deg. F.; others use liquid air which gets it down to about—200 deg. F. In some cases a heavy interference fit is obtained by the combination of chilling the insert and heating the block. Science is remaking an old art.

Modernize Now

Impact of Codes and variable costs due to changes in rates of pay, hours, etc., should make the thinking executive consider the condition of his productive equipment. The margin between success and failure is mighty slim and in these days of intense competition, productivity and machine efficiency are king. Old equipment can no more meet competitive conditions than the car of several years ago can be sold in today's market.

Easy Start

The 660 hp. Winton diesel installed in the Budd three-car Zephyr finds starting an easy task. Nothing conventional about it either. It is started by means of an auxiliary series winding in the main generator, power being supplied by never-failing Exides.

Rubber Replacing

Perhaps the most interesting experimental application thus far made indicative of DuPrene's future possibilities has been its replacement of rubber in the manufacture for test service of pneumatic tires made for high-speed buses and trucks. The remarkable resistance to heat, oxidation and abrasion of such tires suggests that for these uses the mileage obtainable may be sufficiently greater than that of rubber tires to offset the increased cost. For although DuPrene sells at several times the present price of natural rubber, the cost of the rubber in the manufacture of a tire is relatively a minor portion of its final cost.—From the *Industrial Bulletin* of Arthur D. Little.

Big Hand

Just in our humble opinion, one of the most attractive magazine advertisements we have seen of late is the LaSalle spread in S.E.P. for April 14. Art work is by Count Alexis de Sakhnoffsky, well known about the body industry. His interpretation gives LaSalle a new brilliance and color and personality.

Keeps Moving

External broaching has become a dynamic force in the machine shops of the industry. New applications sprouting everywhere are evidence this method has "it." So many things have happened since our Annual meeting paper was written that one could well start all over again, and maybe will.

Centralized

Although many plants have a system of centralized tool stores and tool grinding, some are missing the point by using the same old tool grinding equipment. Old, obsolete tool grinders won't do! Remember that the performance of the entire productive machine depends upon tool form and keenness.—J. G.



Less Arbitrary Control, In Industry U. S. C. C.

THE necessity for the stimulation of confidence and the revival of what might be called the natural forces of recovery, the removal of unnecessary restrictions and the encouragement of self-government rather than of arbitrary political control, received major emphasis at the annual meeting of the U. S. Chamber of Commerce, held in Washington last week.

The recovery program met with both qualified approval and frank criticism, and the latter apparently was responsible for the President's pronouncement that "It is time to stop crying 'wolf' and to cooperate in working for recovery and for the continued elimination of the evil conditions of the past."

* * *

VARIOUS aspects of the meeting which seem to be of particular automotive interest are discussed briefly in the following:

In view of the fact that the APEM code provides for prices that cover cost as established by uniform accounting and since working out an acceptable plan for implementing this provision is the major barrier blocking approval of product group supplements to that code, the discussion of cost protection by Robert H. Montgomery was of particular importance. Mr. Montgomery is a partner in an important New York firm of accountants, has a national reputation and was formerly head of the planning and research division of NRA.

The multitude of unknown factors make it impractical to use a uniform cost formula, Mr. Montgomery asserted, to determine the cost below which it is unfair competition to sell. For this reason, he urged NRA to adopt "lowest reasonable cost" as the criterion, wide discretion to be vested in the administrative agency to interpret this standard in the light of the facts in a particular case.

"Unfortunately," he said, "no one has invented a system under which there can be any certainty that you

can sell your products for more than they cost. . . . I would not use any cost formula as a protection to fair prices because I believe that prices must be based on present conditions much influenced by our estimate of future conditions. . . . If I were to propose a cost formula, I would make my first factor that of management. . . . If I had bad management I would not expect to charge it in as a cost and then expect a profit on it. . . . You can only protect your prices by proper management of your materials and tools and by turning out goods of quality and usefulness and in such reasonable quantity as will not destroy your chances for profit."

* * *

RIGID "no capital expenditure" policies still in force in many companies, are a serious brake on recovery, Ralph E. Flanders, president of Jones and Lamson Machine Co., said. Too frequently, he said, sound salesmanship of machinery convinces the operating executives of the desirability of purchasing new equipment, only to find that although the purchase is justified on rational grounds, it is blocked by an arbitrary, unreasoning financial policy. "Somewhere along the line," he said. ". . . there has been a cold, dead hand which closed around the throat of what had been a beautiful and healthy business prospect."

* * *

URGING State regulation of taxicabs, Paul H. Geyser said that those who furnish the vehicles were the chief beneficiaries under present conditions. Mr. Geyser is president of the Terminal Cab Corp., New York, and was formerly an executive of the old Yellow Cab Mfg. Co. He charged that the economic stability of the business has been destroyed by the rapid and uncontrolled increase in the numbers of cabs, and asserted that to restore order, regulation was essential. Under existing circumstances, he continued, "If the

instalments or rentals are paid, the seller makes a good profit. If they are not paid he can recover possession of the vehicle or rent the car to another operator. Either way he wins and the operator loses."

* * *

NO very definite attitude as to the future of NRA crystallized at the meeting except the very general one that what was good should be retained and what was bad eliminated. There was some feeling, however, that something approximating code control was permanently desirable in some basic industries, at least. Continued code regulation of all business, particularly the retail trades, was questioned both as to the necessity for such control and its constitutionality. There apparently also was some sentiment favoring consolidation of all local administrations of retail codes into a single agency in each community.

* * *

DISCUSSIONS of transportation rates found the conflicting interests as far apart as ever. The railroads stood for coordination, regulation of rates and practices of all transportation agencies, discontinuance of Federal subsidies to transportation, and making all consumers tax payers and not tax consumers. In connection with their position on subsidies and taxes, they naturally forgot to mention the handouts they have been getting from the RFC and the huge subsidies which the Government granted them in the past.

The tendency of the Interstate Commerce Commission to move away from the "what-the-traffic-will-bear" theory of rate making and toward mileage and cost of service basis, was criticized as disruptive of established business relationships, by Charles E. Bockus, a coal operator. Curiously enough he characterized the attempt to rationalize rates as arbitrary, despite the difficulties of justifying the "what-the-traffic-will-bear" theory on logical grounds. The

More Confidence Meeting Emphasis

point is obviously of considerable importance to motor transportation as its competitive opportunities are greater if rail rates are set on a cost basis.

Defending truckers against charges of rate instability, Ted Rodgers, president of American Trucking Associations, Inc., charged that the destructive rate war now being carried on by the railroads was primarily responsible for the situation. Destructive rate competition among truck operators, he declared, can be controlled under the trucking code. He opposed subjecting trucks to railroad regulation on the ground that they were entirely different agencies and required individual treatment if the public interest was to be conserved. Such regulation would threaten for-hire trucking as rate increases inevitably would cause shippers to

operate their own trucks. Speaking for the American Petroleum Institute, Judson C. Welliver asserted that the railroads, which he characterized as "obsolescent and decadent," were urging legislation to destroy highway transportation.

* * *

SUPPORT for the campaign which business has been waging against the unnecessarily drastic features of the Securities Act came from quarters close to the administration when Federal Reserve Board Governor Black said, "America needs worse than anything else the turning loose of her capital market. . . . I would amend any law that was strangling American recovery in business, and I think the Securities Act needs amending to that end." Continuing he said, "I decry any effort, social-

istic or otherwise, to state to American business that American business hasn't got a right to profit in its operations."

* * *

A RATHER pointed suggestion that now that the administrative stage of the recovery program had been reached, a different type of leadership was needed than during the promotional period, was made by Arthur Krock, Washington correspondent for the New York Times. In this connection he said:

"We are approaching a time, I think, when a change of personnel would be a useful thing in the Government. Presidents should have Hugh Johnsons to get things going. But when the experimental period has passed, at it has now, and the era of administration and reality arrive, these crusaders have become too attached to their own ideas. Their spoken and written words hamper them. Relationships have grown up between them and their assistants which make the air hiss with 'yesses.' Recruiting officers and drill masters are invaluable before battle. But when their work is done it is time to put the strategists and the tacticians in command."



It's Time to Call
Off the Wolves!

Two Other Fellows May Write Code

FOLLOWING the official progress of the motor truck retailing code has been a bit difficult. We admit being somewhat confused.

First the truck manufacturers group developed a code suggestion and then, after several months work had been accomplished, Washington apparently decided that the dealer code authority should be the responsible party. Now we understand that the dealer code authority has asked the manufacturer group to cooperate in preparation of a code for submission.

All we hope is that after a few more weeks work somebody doesn't come along and discover that after all, it must have been two other fellows.

* * *

Price Increases Slow Retail Sales

RECENT passenger car price increases have affected sales adversely—seriously so in a number of areas. Partly this has been due to natural economic reaction and partly to the fact that the dealer code permitted no cushioning of the shock as in the past.

Usually, the public has been able to buy at the old price or with long trades, cars which a dealer himself had purchased prior to the announced list price advance. Movement of these stocks helped to tide over the 30 days or so during which the public was getting used to the new levels. The dealer who made a bad guess as to selection of body types prior to the price increase, particularly, is having a harder time moving his stock than in the past. Special prices

JUST AMONG

or temporary long trading is not open to him.

So far the NRA regulated used car allowance has been working out rather well, all things considered. Now with prices up and sales hesitating, the program may be facing its most severe test. If dealer sentiment is sincerely behind the program—as it seems to be—experiences of the next few months may serve to integrate it permanently into the automobile selling scheme. Only active display of that sentiment in individual transactions will do the trick. Obedience never can be policed in a group whose individual members are not clearly favorable to the idea as applied to *their own* operations. Remember the 18th amendment?

* * *

Shorter Hours Cut Purchasing Power

SPEAKING dispassionately but bluntly, A. P. Sloan in his Boston address put on record the plain beliefs of most automotive executives as regards the New Deal and its industrial implications.

Recognizing fully industry's social obligations with the statement that "our progress is measured solely by the advancement in well-being, socially and economically, of the American worker," Mr. Sloan struck out effectively against the fallacy that

"the number of man-hours of labor is definite and that the unemployment question is solved by dividing the number of man-hours by the number of workers."

Having inveighed against this particular fallacy at some length before it became incorporated in the law of the land, renewed opposition from so great an industrialist as Mr. Sloan is especially gratifying to us. Mr. Sloan strengthens his position by full approval of "reduction in hours of labor through evolution—on an economic basis coincident with a decline in cost of production." The temporary addition to the number of workers by arbitrarily shortening hours, Mr. Sloan stressed, is more than offset by the reduction in total work available brought about by increased costs and by the fact that every worker becomes poorer in terms of his or her ability to buy.

* * *

Sloan Stands for Open Shop

THE big blow-off of the Sloan statement came, of course, in his frank declaration that "under no circumstances will we recognize any union as that term is interpreted by the American Federation of Labor—that means the closed shop. There need be no misunderstanding as

G OURSELVES

to the position of General Motors on that point."

Coming as the climax of that phase of his Boston Chamber of Commerce talk which began with approval of collective bargaining as a "step forward in American industrial life," this ultimatum puts at rest all doubt about the final position of General Motors on this important point. The fact that the closed shop would make every American workman pay a price for his job was emphasized by Mr. Sloan as a potent reason behind the position taken. "We will deal with any representation of our employees, properly established," he said, "... on the other hand, we will, under no circumstances, permit any group, be it a majority or a minority group, from preventing other groups dealing with us."

While Mr. Sloan's talk may well make now-steaming animosities boil over, it cannot help but clarify the lines on which battle will be drawn and thus bring nearer that final solution which can be effected only through honest facing of actual issues. It is another important move toward the elimination of industrial shadow-boxing.

* * *

More Knee Wheels

On 1935 Models

EVERY time an entirely new feature appears on some cars

but not on others, rumors and speculations run riot in the trade about its effectiveness and its permanency. Independent wheel suspension has been no exception.

Early troubles in service and in production—which actually did exist—almost certainly were exaggerated in trade gossip. And now appearance of a Standard Chevrolet and a Standard Lafayette without "knee-wheels" is being hailed by some trade gossips as evidence that the new feature is slated eventually for the discard. These same folks are busy asking: "Which way will the Chrysler group go as regards 'knee-wheels'?"

Well, everybody is entitled to his own opinion. Ours is that 1935 will find knee-wheels on more models than did 1934.

The commercial researchers of the industry know that statistical evidence is available pointing to a real public consciousness of knee-wheels and a measurable desire to have them despite little experience. Technical troubles are being overcome. Several manufacturers whose 1934 cars have conventional springing but who were sold on the knee-wheel idea last year will be ready with what they consider the right i.w.s. equipment for their 1935 cars; they will have completed their experimental work—not changed their minds.

But we don't think that knee-wheels will be universal on American cars in 1935 and we don't think that knee-wheels will be essential to commercial success.

* * *

Sizes and Weights In Uniform Act

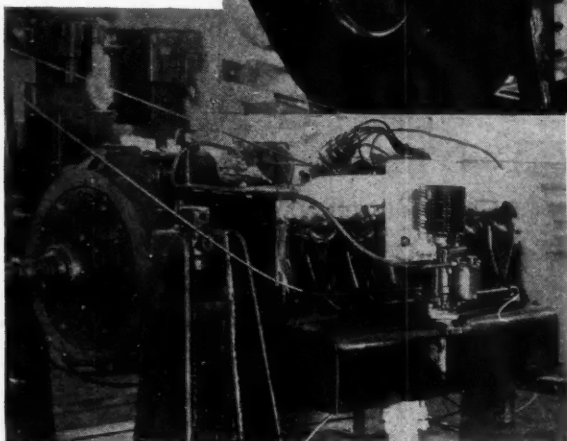
NO detail of the big National Conference on Street and Highway Safety meeting this month will interest automotive men more than the action taken on vehicle weight and performance recommendations submitted by a special sub-committee headed by Robbins B. Stoeckel. (See *Automotive Industries* of April 14, p. 514.)

While a few points in the recommendations themselves may be the cause of debate, the big question seems to center around whether or not specific recommendations on limitations of gross and axle weight of vehicles and minimum requirements for their performance are to become a part of the Uniform Motor Vehicle Code established as a guide for legislatures. So far this Code has not contained provisions on this subject. Because the Code constantly is gaining wider recognition from State legislatures, there are those among the automotive men who would like to see it contain gross weight restrictions. Presence of such restriction in this Code, this group contends, would help to prevent some of the worst offenses against economic transport which legislatures are only too prone to commit, and mitigate the extent to which railroad interests could *ad lib* on the subject.

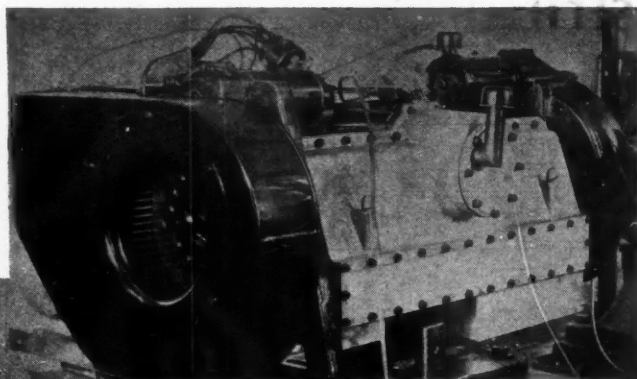
Just what will happen remains to be seen.—NGS.

Doman-Marks Horizontal Engine

Below — Domark horizontal engine seen from cylinder side



Above — Domark horizontal engine seen from crankcase side



AS announced in a recent issue of *Automotive Industries*, the Doman-Marks Engine Co., Amesbury, Mass., now offers three horizontal air-cooled engines in addition to its regular line of vertical engines. We understand that these engines were originally developed for a foreign government, for installation in crawler-type tractors where it is essential that the over-all height be quite low. The same requirement is made in connection with engines for cab-over-engine trucks, and it is therefore not unlikely that these engines will find application in motor trucks in the future.

The new horizontal engines, known as the 6AH line, are similar to three vertical engines produced by the company, the 6A-309, the 6A-377 and the 6A-400—in which designations the last figure represents the piston displacement—except that they are laid on their sides, as it were. The principal changes which had to be made to enable the engines to operate efficiently in a horizontal position had to do with the lubricating system.

To drain oil from the crankcase proper, thirteen $\frac{5}{8}$ -in. holes were drilled in the lower flange, through which the oil drains to the sump. A large drain hole was drilled in the timing-gear case, so that oil working through the front crankshaft and

camshaft bearings will not pile up and leak out along the Acme threads. The rear main bearing cap was changed so that the oil will drain off at the lowest point, the regular drain hole being plugged. To prevent oil getting into the generator winding, the regular drain hole of the front bearing was plugged and a new hole drilled at the lowest point.

A lead is taken off the oil-pressure relief valve to lubricate the valve mechanism. This assures that the amount of oil delivered to the mechanism is properly controlled. From the valve mechanism the oil drains

through a bifurcated conduit whose two ends terminate in the front and rear sumps respectively.

Two oil pumps are provided, one drawing oil from the front and delivering it to the rear sump, the other drawing oil from the rear sump and delivering it to the regular oil header. Both pumps have a common shaft, which is driven directly off the camshaft. The two oil sumps hold about 8 quarts of oil, and the total capacity of the system is 10 quarts.

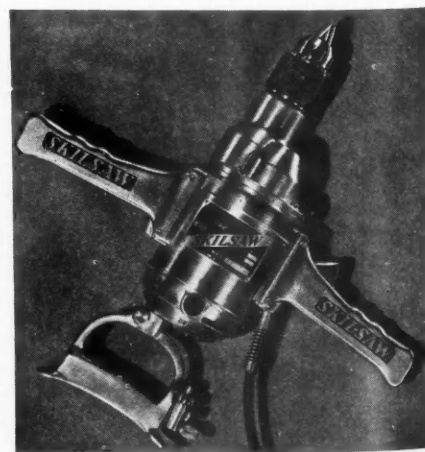
Tests indicated that the thrust bearing in the oil-pump pedestal, which in the vertical engine is lubricated by splash, would require pressure lubrication in this engine, and oil is carried to it through a small tube from the main header. The standard relief valve, which is of the cylindrical type, did not function properly with the engine in the horizontal position, and it was therefore replaced by a ball valve.

To prevent the carburetor air from being unduly heated a deflector is placed between the carburetor and the exhaust manifold, as plainly shown in one of the photographs, and it is also recommended that the air cleaner be located outside the engine space, at least during the warm season, as a further measure to keep down the temperature of the inlet air.

In view of the fact that the original engines were intended for use in a tractor with quite low ground speed, it was decided to use a fan of unusually high capacity—with 64 blades of the "forward-curve" type, which has high-pressure characteristics. In the engine illustrated the air from the cooling system is discharged in a downward direction. It might be advantageous in a truck installation to discharge the air at the sides, but adequate discharge areas would have to be provided.

Light Weight for Heavy Duty Work

Skilsaw, Inc., Chicago, Ill., has introduced a line of heavy-duty portable electric drills ranging from $\frac{1}{4}$ to $\frac{1}{2}$ in. drill capacity. The motor is cooled by a balanced fan mounted on the armature shaft, the air current being directed by a baffle plate. Bodies are of die-cast aluminum for light weight and are designed for balance and ease of handling. The switch has 100 per cent overload capacity with a patented snuff arc construction. Jacobs chucks are used throughout the line.



Uneven Distribution of Sales Gains Makes 1933 Earnings Showing Spotty

Resumption of buying outside of low-priced field needed to spread prosperity among all of industry's vehicle producers

by Don Blanchard

Editor,
Automotive Industries

PRIMARILY due to the substantial improvement in earnings registered by General Motors and Chrysler, a consolidation of the 1933 financial statements of eleven car and truck makers, including all the leading car producers except Ford and Studebaker, reveals net income of \$79,129,000 against a deficit of \$38,591,000 in 1932.

Sales of the group both in units and dollars showed a substantial expansion last year over 1932, but here again the increases were due entirely to the expansion in the volume of General Motors and Chrysler, as the remaining nine producers as a group sustained sales decreases.

For the 11 makers, unit sales increased 46 per cent while dollar volume rose 32 per cent, the difference in these two gains reflecting lower average car prices in 1933 than in 1932.

Net income for the group amounted to 8.6 per cent of sales as contrasted with a deficit of 5.5 per cent in 1932. Return on the tangible net worth of the group as reflected by balance sheets amounted to 7 per cent last year as compared with a deficit of 3.4 per cent in the previous year.

As previously indicated the marked improvement registered by G.M. and Chrysler make the picture for the group as a whole considerably brighter than it was for many of the individual companies. Detailed analysis of the figures demonstrates that what the industry needs most to distribute prosperity broadly among its mem-

bers is a resumption of buying in the middle and high-price fields as it is in these sections of the market that the numerical majority of the industry's vehicle makers is dependent for sales volume.

Outside of General Motors and Chrysler, Mack was the only producer in the group to sell more units in 1933 than in 1932 while only Mack, Packard and Reo secured increased dollar volume. Although only two of the nine—Graham and Packard—reported net income for 1933, Hudson, Hupp, Mack, Reo and White all reported smaller deficits than in 1932. Nash went into the red last year for the first time in its history, while a sharp reduction in volume resulted in a substantial increase in Auburn losses over 1932.

Stockholders of the 11 companies didn't fare quite so well in 1933 as in the preceding year, as common and preferred dividends declined from \$76,366,000 to \$70,512,000. Holders of the stocks of six of the

companies received no return at all on their investment in 1933.

Generally speaking the end of 1933 found the group in a strong liquid position. Cash and securities decreased by a small amount, \$299,177,000 to \$286,162,000. Reflecting the increased volume, inventories rose during the year from \$132,691,000 to \$187,715,000. Both current assets and current liabilities increased, the latter relatively more than the former, with the result that the current ratio of group declined from 5.7 at the end of 1932 to 4.6 at the end of 1933. Working capital, however, increased from \$401,664,000 to \$408,910,000. This improvement again was due almost entirely to G.M. and Chrysler, as of the remaining companies only Graham and Packard improved their current position during the year.

The book value of the plant and property after depreciation of the group declined from \$504,610,000 to \$471,456,000 last year, but the bulk of this decrease was represented by General Motors.

Tangible net worth of the 11 companies decreased less than \$1,000,000 in 1933, from \$1,125,104,000 to \$1,124,663,000. This is due to the fact that the increase in the net worth of General Motors, Chrysler, Graham and Packard almost entirely offset the reductions shown by the remaining producers.

Detail comparative figures for the 11 companies for the last five years follow on the two succeeding pages.

A Comparative Summary

(Based on a consolidation of the financial statements of General Motors, Chrysler, Auburn, Graham, Hudson, Hupp, Mack, Nash, Packard, Reo and White.)

(000 Omitted)

	1933	1932	Per Cent Change
Domestic Units Sales.....	1,222	837	+46
Sales Volume	\$918,853	\$697,086	+32
Net Income	79,127	D38,591	...
Dividends	70,512	76,366	-8
Cash and Securities.....	286,162	299,177	-4
Inventories	187,715	132,691	+41
Current Assets	522,588	487,865	+7
Current Liabilities	113,687	86,200	+32
Working Capital	408,910	401,664	+2
Plant & Property, Dep....	471,456	504,610	-7
Tangible Net Worth.....	1,124,663	1,125,104	...

D—Deficit.

U. S. Registrations of New Vehicles

	1929	1930	1931	1932	1933
General Motors..	1,491,000	1,048,000	937,000	522,000	753,000
Chrysler Corp....	388,900	245,290	243,530	199,850	413,700
Total	1,879,900	1,293,290	1,180,530	721,850	1,166,700
Auburn	19,300	13,370	31,130	11,980	5,040
Graham	62,600	30,650	19,320	12,855	10,130
Hudson	262,900	95,390	62,100	37,420	2,950
Hupp	45,900	24,720	17,530	10,790	6,730
Mack	6,800	4,900	3,000	1,425	1,650
Nash	108,800	51,950	39,600	20,230	11,350
Packard	46,200	28,800	16,350	11,055	9,080
Reo	30,900	18,040	12,000	7,060	6,670
White	6,100	4,400	2,600	2,140	1,380
Total	589,500	272,220	203,630	114,955	54,980
Total	2,469,400	1,565,510	1,384,160	836,805	1,221,680
Total U. S. Car & Truck Registrations	4,407,263	3,036,678	2,222,025	1,276,812	1,739,663

Sales Volume (000 Omitted)

	1929	1930	1931	1932	1933
General Motors..	\$1,504,404	\$983,375	\$808,841	\$432,312	\$569,011
Chrysler Corp....	375,033	207,789	183,805	136,547	238,676
Total	\$1,879,437	\$1,191,164	\$992,646	\$568,859	\$807,687
Auburn	37,551	24,114	37,086	12,845	5,360
Graham	64,490	27,777	16,499	10,491	8,333
Hudson	201,018	78,095	38,236	25,862	23,521
Hupp	52,506	23,445	.....	8,751	6,119
Mack	57,227	43,644	27,621	13,218	15,744
Nash .....	.....	.....	35,928	15,331	8,984
Packard	†107,542	57,690	29,987	15,516	19,230
Reo	48,011	29,671	17,044	9,096	10,260
White	48,653	36,533	23,517	17,117	13,615
Total	\$564,492	\$297,524	\$189,990	\$104,145	\$96,063
Total	\$2,443,929	\$1,488,688	\$1,182,636	\$673,004	\$903,750

Totals do not include Hupp and Nash.
†Year ended Aug. 31, 1929.

Net Income

After Interest, Taxes and Depreciation (000 Omitted)

	1929	1930	1931	1932	1933
General Motors..	\$245,970	\$153,766	\$96,877	\$165	\$83,214
Chrysler Corp....	21,902	234	1,469	d11,254	12,129
Total	\$267,872	\$154,000	\$98,346	d\$11,089	\$95,343
Auburn	3,603	1,018	3,580	d975	d2,308
Graham	d1,464	d4,969	d4,736	d2,811	67
Hudson	11,595	325	d1,991	d5,429	d4,410
Hupp	3,469	d923	d4,249	d4,515	d1,778
Mack	6,841	2,008	d3,032	d1,480	d948
Nash	18,014	7,601	4,808	1,030	d1,189
Packard	25,183	9,034	d2,909	d6,824	107
Reo	1,074	1,000	d2,749	d2,879	d2,588
White	2,548	d474	d3,235	d3,619	d8,169
Total	\$70,863	\$14,620	d\$14,513	d\$27,502	d\$16,216
Grand Total..	\$338,735	\$168,620	\$83,833	d\$38,591	\$79,127

d Deficit.

Common and Preferred Dividends (000 Omitted)

	1929	1930	1931	1932	1933
General Motors..	\$165,954	\$139,973	\$139,876	\$63,199	\$63,005
Chrysler Corp....	13,336	11,065	4,412	4,390	4,304
Total	\$179,290	\$151,038	\$144,288	\$67,589	\$67,309
Auburn	645	764	824	835	553
Graham	372	362	329	30	.....
Hudson	8,180	6,518	1,597	.....	.....
Hupp	2,760	2,239	.....	.....	.....
Mack	4,534	4,163	1,680	692	665
Nash	16,380	13,650	9,555	4,095	1,985
Packard	17,234	9,741	6,746	.....	.....
Reo	2,400	1,600	772	.....	.....
White	1,000	1,503	355	3,125	.....
Total	\$53,505	\$40,540	\$21,858	\$8,777	\$3,203
Grand Total..	\$232,795	\$191,578	\$166,146	\$76,366	\$70,512

Cash and Securities (000 Omitted)

	1929	1930	1931	1932	1933
General Motors..	\$127,352	\$179,037	\$205,029	\$172,781	\$177,679
Chrysler Corp....	38,706	41,644	50,233	42,603	37,370
Total	\$166,058	\$220,681	\$255,262	\$215,384	\$215,049
Auburn	2,082	4,716	8,410	5,138	3,983
Graham	6,180	2,995	1,482	528	707
Hudson	17,145	13,983	8,909	4,199	2,680
Hupp	10,156	9,913	7,096	4,904	3,585
Mack	1,899	3,116	7,041	9,768	7,766
Nash	42,011	38,095	36,550	32,135	29,915
Packard	17,910	18,612	13,995	13,387	15,161
Reo	9,563	8,015	6,159	5,972	1,480
White	10,657	9,808	8,630	7,762	5,836
Total	\$117,603	\$109,253	\$98,272	\$83,793	\$71,113
Grand Total..	\$283,661	\$329,934	\$353,534	\$299,177	\$286,162

Inventories (000 Omitted)

	1929	1930	1931	1932	1933
General Motors..	\$188,473	\$136,299	\$106,471	\$75,479	\$115,585
Chrysler Corp....	38,102	26,055	22,104	18,377	34,557
Total	\$226,575	\$162,354	\$128,575	\$93,856	\$150,142
Auburn	8,754	5,158	4,454	4,011	2,780
Graham	7,343	5,430	2,555	1,410	1,052
Hudson	13,467	6,844	4,476	3,615	4,492
Hupp	8,481	5,859	4,271	2,115	1,736
Mack	20,306	15,967	10,369	9,047	8,694
Nash	5,246	2,768	1,348	1,023	2,077
Packard	13,624	11,092	7,874	5,763	5,451
Reo	10,051	6,675	5,200	3,454	3,310
White	15,566	13,992	9,219	8,397	7,981
Total	\$102,838	\$73,785	\$49,766	\$38,835	\$37,573
Grand Total..	\$329,413	\$236,139	\$178,341	\$132,691	\$187,715

Current Assets (000 Omitted)

	1929	1930	1931	1932	1933
General Motors..	\$368,961	\$364,817	\$358,503	\$279,978	\$317,515
Chrysler Corp....	90,313	74,029	76,320	65,682	74,640
Total	\$459,274	\$438,846	\$434,823	\$345,660	\$392,155
Auburn	13,327	12,270	14,401	10,898	8,549
Graham	14,554	9,159	4,647	2,163	1,891
Hudson	34,474	25,133	14,749	8,666	7,533
Hupp	19,882	16,173	11,926	7,283	5,661
Mack	44,293	37,196	32,225	29,205	26,695
Nash	53,141	43,388	39,787	34,145	33,191
Packard	38,080	33,969	24,519	20,450	22,252
Reo	22,688	17,385	12,434	9,984	7,887
White	32,197	27,779	23,460	19,411	16,784
Total	\$272,636	\$222,452	\$178,148	\$142,205	\$130,433
Grand Total..	\$731,910	\$661,298	\$612,971	\$487,865	\$522,588

Current Liabilities (000 Omitted)

	1929	1930	1931	1932	1933
General Motors..	\$117,673	\$83,780	\$84,587	\$57,822	\$76,183
Chrysler Corp....	18,928	11,455	11,328	16,395	21,223
Total	\$136,601	\$95,235	\$95,915	\$74,217	\$97,406
Auburn	3,296	2,831	1,924	330	618
Graham	2,984	3,032	2,619	1,297	995
Hudson	8,271	5,301	3,590	2,200	4,461
Hupp	2,541	1,728	1,715	1,074	1,107
Mack	7,209	2,377	1,632	1,667	1,905
Nash	8,860	5,758	2,710	1,145	2,312
Packard	13,204	5,993	3,123	2,325	2,330
Reo	2,717	1,663	1,398	849	955
White	3,176	1,910	1,353	1,096	1,598
Total	\$52,258	\$30,593	\$20,064	\$11,983	\$16,281
Grand Total..	\$188,859	\$125,828	\$115,979	\$86,200	\$113,687

	Working Capital (000 Omitted)					Plant and Property—Depreciated (000-Omitted)				
	1929	1930	1931	1932	1933	1929	1930	1931	1932	1933
General Motors....	\$251,288	\$281,038	\$273,916	\$222,156	\$241,332	\$415,785	\$395,374	\$362,628	\$328,274	\$303,765
Chrysler Corp.....	71,385	62,574	64,992	49,286	53,417	83,624	74,173	65,513	61,697	60,409
Total	\$322,673	\$343,612	\$338,908	\$271,442	\$294,749	\$499,409	\$469,547	\$428,141	\$389,971	\$364,174
Auburn	10,031	9,439	12,477	10,568	7,930	7,075	7,810	7,834	7,343	6,732
Graham	11,570	6,127	2,028	866	896	13,987	12,907	11,843	6,640	6,240
Hudson	26,203	19,832	11,159	6,466	3,072	33,276	30,173	29,338	25,614	24,440
Hupp	17,342	14,445	10,211	6,209	4,554	16,407	13,828	11,315	8,463	7,843
Mack	37,084	34,819	30,593	27,538	24,790	20,506	19,366	17,184	16,643	16,091
Nash	44,281	37,630	37,077	33,000	30,879	9,161	8,343	6,819	6,029	5,413
Packard	24,876	27,976	21,396	18,125	19,922	37,870	35,911	33,442	31,319	29,117
Reo	19,972	15,722	11,036	9,135	6,932	10,689	10,335	9,663	4,646	3,899
White	29,021	25,870	22,107	18,315	15,186	9,634	9,187	8,545	7,942	7,407
Total	\$220,380	\$191,860	\$158,084	\$130,222	\$114,161	\$158,605	\$147,860	\$135,983	\$114,639	\$107,282
Grand Total....	\$543,053	\$535,472	\$496,992	\$401,664	\$408,910	\$658,014	\$617,407	\$564,124	\$504,610	\$471,456

	Capital Stock (000-Omitted)					Surplus (000-Omitted)				
	1929	1930	1931	1932	1933	1929	1930	1931	1932	1933
General Motors....	\$571,924	\$622,537	\$622,537	\$622,537	\$622,537	\$380,560	\$344,265	\$301,266	\$238,232	\$248,961
Chrysler Corp.....	73,756	73,263	73,122	21,847	21,807	54,087	42,763	39,679	52,695	60,043
Total	\$645,680	\$695,800	\$695,659	\$644,384	\$644,344	\$434,647	\$387,028	\$340,945	\$290,927	\$309,004
Auburn	7,993	9,045	9,849	10,714	10,946	6,210	5,683	7,596	4,859	1,738
Graham	14,004	13,826	13,690	3,788	3,783	8,570	3,218	21,823	2,071	2,199
Hudson	19,958	19,958	19,958	19,958	19,958	38,726	30,266	20,146	11,686	7,276
Hupp	14,754	15,121	13,319	13,291	13,291	18,942	13,807	9,443	2,013	236
Mack	3,900	3,940	3,940	3,381	3,337	54,761	52,110	47,397	41,490	39,744
Nash	13,887	13,887	13,887	13,887	13,887	39,771	33,722	29,123	26,301	23,793
Packard	50,000	50,000	50,000	40,000	40,000	15,584	14,877	5,223	8,398	8,905
Reo	20,000	20,000	18,105	9,000	9,000	10,834	7,296	3,874	5,284	2,718
White	40,000	40,000	32,500	31,250	31,250	8,678	6,991	7,979	2,088	21,081
Total	\$184,496	\$185,777	\$175,248	\$145,269	\$145,452	\$202,076	\$167,970	\$128,958	\$104,190	\$85,528
Grand Total....	\$830,176	\$881,577	\$870,907	\$789,653	\$789,796	\$636,723	\$554,998	\$469,903	\$395,117	\$394,532

d Deficit.

	Capital and Surplus (000-Omitted)					Good-Will, Patents, etc. (000-Omitted)				
	1929	1930	1931	1932	1933	1929	1930	1931	1932	1933
General Motors....	\$952,484	\$966,802	\$923,803	\$860,769	\$871,498	\$50,680	\$51,949	\$51,939	\$51,839	\$51,838
Chrysler Corp.....	127,843	116,026	112,801	74,542	81,850	25,000	25,000	25,000	.....	.....
Total	\$1,080,327	\$1,082,828	\$1,036,604	\$935,311	\$953,348	\$75,680	\$76,949	\$76,939	\$51,839	\$51,838
Auburn	14,203	14,728	17,445	15,573	12,684	.....	.....	.....	.....	.....
Graham	22,574	17,044	11,867	5,859	5,982	.....	.....	.....	.....	.....
Hudson	58,684	50,224	40,104	31,644	27,234	.....	.....	.....	.....	.....
Hupp	33,696	28,928	22,762	15,304	13,527	.....	.....	.....	.....	.....
Mack	58,661	56,050	51,337	44,871	43,081	2,438	2,438	2,438	2,438	2,438
Nash	53,658	47,609	43,010	40,188	37,680	.....	.....	.....	.....	.....
Packard	65,584	64,877	55,223	48,398	48,905	.....	.....	.....	.....	.....
Reo	30,834	27,296	21,979	14,284	11,718	.....	.....	.....	.....	.....
White	48,678	46,991	40,479	33,338	30,169	5,389	5,389	5,389	5,389	5,389
Total	\$386,572	\$353,747	\$304,206	\$249,459	\$230,980	\$7,827	\$7,827	\$7,827	\$7,827	\$7,827
Grand Total....	\$1,466,899	\$1,436,575	\$1,340,810	\$1,184,770	\$1,184,328	\$83,507	\$84,776	\$84,766	\$59,666	\$59,666

	Capital and Surplus less Good-Will, etc. (000-Omitted)					Funded Debt—Bonds, Debentures, etc. (000-Omitted)				
	1929	1930	1931	1932	1933	1929	1930	1931	1932	1933
General Motors....	\$901,804	\$914,853	\$871,864	\$808,930	\$819,660	\$1,992	.....	.....	.....	.....
Chrysler Corp.....	102,843	91,026	87,801	74,542	81,850	49,765	\$47,583	\$44,411	\$42,331	\$40,027
Total	\$1,004,647	\$1,005,879	\$959,665	\$883,472	\$901,510	\$51,757	\$47,583	\$44,411	\$42,331	\$40,027
Auburn	14,203	14,728	17,445	15,573	12,684	512	397	359	131	98
Graham	22,574	17,044	11,867	5,859	5,982	3,125	2,900	2,325	1,805	1,567
Hudson	58,684	50,224	40,104	31,644	27,234	.....	.....	.....	.....	.....
Hupp	33,696	28,928	22,762	15,304	13,527	.....	.....	.....	.....	.....
Mack	56,223	53,612	48,899	42,433	40,643	2,200	2,000	1,800	541	.....
Nash	53,658	47,609	43,010	40,188	37,680	.....	.....	.....	.....	.....
Packard	65,584	64,877	55,223	48,398	48,905	.....	.....	.....	.....	.....
Reo	30,834	27,296	21,979	14,284	11,718	.....	.....	.....	.....	.....
White	43,289	41,602	35,090	27,949	24,780	42	39	.....	.....	.....
Total	\$378,745	\$345,920	\$296,379	\$241,632	\$223,153	\$5,879	\$5,336	\$4,484	\$2,477	\$1,665
Grand Total....	\$1,383,392	\$1,351,799	\$1,256,044	\$1,125,104	\$1,124,663	\$57,636	\$52,919	\$48,895	\$44,808	\$41,692

How Temperature and Closing Speeds Affect Valve and Valve Seat Wear

British research shows that—

When exhaust tappet clearance decreases rapidly, it may be due principally either to valve seat wear or deformation of the valve, depending on the valve material.

The bigger the initial clearance the more rapidly this loss in clearance takes place, owing to the rise in seating velocity.

It also increases with valve temperature up to a certain value, and then decreases (probably because the valve material then becomes soft and can no longer erode the seat).

Valves can be kept cooler by carrying the guides further into the exhaust ports, and still cooler by counterboring the upper part of the guide which cannot be lubricated efficiently. Small valves run cooler and an increase in stem diameter helps.

Compression ratio does not affect exhaust valve temperature much, but weak mixtures and retarded ignition tend to make them run cooler.

THE effects of temperature and closing velocity on valve-seat wear, and the factors affecting the temperatures of the exhaust valve and its seat, are dealt with in a preliminary report issued recently by the Institution of Automobile Engineers, London, on an investigation which its Research Department has had under way for about a year.*

*Valve-Seat Wear. Preliminary Report on (a) Effect of Temperature and Closing Velocity on Wear; (b) Factors Affecting Exhaust-Valve and Seat Temperatures. By C. G. Williams, M. Sc.—The Institution of Automobile Engineers, Research Dept., 5 Bolton Road, Chiswick, London W. 4.

In the report the term "sinkage" is introduced. This sinkage was measured by means of a special micrometer held in a fixture which could be bolted to a machined face on the cylinder head, the micrometer making contact with the tip of the valve stem. It was realized early in the tests that mere measurement of valve sinkage would not differentiate between wear occurring on the valve-seat insert and wear and distortion occurring on the valve itself. For each set of runs, therefore, a new valve and insert were used, the width of the insert seat being accurately measured. In addition, measurements were made of the distances from the tip of the valve stem to the shoulder on the stem, from this shoulder to the top plane of the valve head, and from this plane to the bottom of the dish in the head. The former measurements enabled the actual sinkage due to wear of the insert to be determined from the widening of the seat, while the latter measurements revealed distortion or stretch in the head, neck or stem of the valve.

Sinkage tests were carried out, not on

an actual engine, but on a special testing machine consisting essentially of part of an overhead-valve A.E.C. cylinder head, the place of the cylinder barrel being taken by a gas-heated muffle. The latter is supplied with gas from the mains and with air under pressure from a blower, the temperature in the muffle being varied in accordance with requirements, but usually being of the order of 2000 deg. F. The inlet valve is permanently closed, while the exhaust valve is operated in the normal manner through an overhead camshaft which is chain-driven by an electric motor. Thus the exhaust valve is subjected to the radiant heat from the muffle and in addition to the products of combustion which pass between the valve and its seat when the valve opens. These products are taken away through an exhaust pipe. The cylinder head is water-cooled by thermo-siphon circulation, the outlet temperature being kept at 167 deg. F., and the exhaust-valve stem is lubricated by splash from the camshaft, which runs in an oil bath.

Tests with valves of KE.965 steel showed that the valve sinkage was due

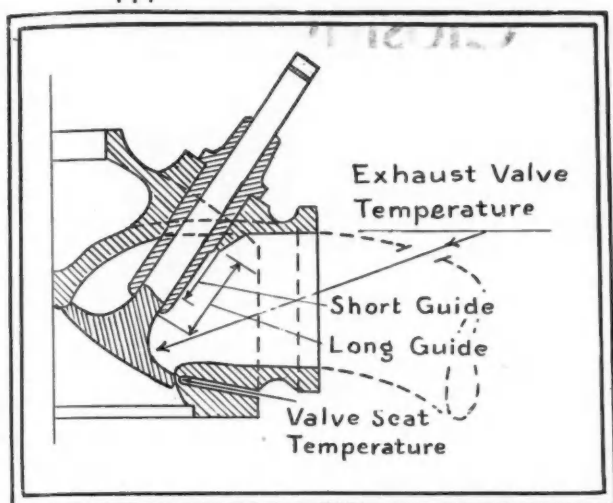


Fig. 1—Valve and seat of water-cooled J.A.P. engine

of the following composition: Total carbon, 3.33; combined carbon, 2.05; silicon, 0.58; manganese, 0.43; phosphorus, 0.43; chromium, 0.29; nickel, 0.10. The inserts had a hardness of 210 Brinell.

With the KE.965 valves, a seat temperature of 635 deg. F., and a valve temperature of 1318 deg. F., the total sinkage increased practically uniformly with time, amounting to 0.0075 in. after 50 hrs. when the tappet clearance was 0.006 in., and to 0.048 in. after 50 hrs. when the tappet clearance was 0.020 in. The KE.965 steel with which these results were obtained is a high nickel-chromium steel containing also a certain amount of tungsten, the composition being as follows: Carbon, 0.41; nickel, 14.72; chromium, 14.00; tungsten, 2.07; silicon, 0.92; manganese, 0.79. Analysis of the valve-lift curve showed that the seating velocities were 2.4 and 1.2 ft. per sec. for tappet clearances of 0.020 and 0.006 in. respectively. Measurements after the test showed that practically all of the sinkage was due to actual wear of the seat insert, there being no dishing of the valve head in any of the tests on valves of this material, although there was a certain amount of stretch in the head and neck of the valve.

With valves of this same material, the total valve-seat wear in 50 hrs. with a tappet clearance of 0.020 in. varied from 0.011 in. for a valve temperature of 1200 deg. F. and a seat temperature

an increase in valve temperature.

An aluminum head reduced valve and seat temperatures. With increasing valve-seat area the valve temperature first increased and then decreased slightly. Temperatures observed with KE.965 and Silchrome steel were almost equal. Retarded ignition and over-weak mixtures did not result in increased temperatures, maximum temperatures being obtained with normal mixture setting and optimum advance. The effect of a given alteration in water-outlet temperature was an almost equal alteration in valve and seat temperatures.

The valve seat inserts used in all of the tests were made of alloy cast iron

very largely to actual seat wear, and that it increased about eight-fold when the tappet clearance was increased from 0.006 to 0.020 in. Seat wear increased rapidly with an increase in seat temperature from 1200 to 1380 deg. F., but decreased sharply above 1380 deg. F. Wear was, however, almost independent of valve-seat area. With valves of silicon-chromium steel, sinkage was due almost entirely to "dishing" of the valve head. Sinkage increased rapidly with temperature and was much greater with the 0.020 in. clearance than with the 0.006-in. clearance.

Owing to the importance of temperature, measurements of valve and seat temperatures were made on some modern engine, viz., J.A.P., Thornycroft, Austin and Talbot, the speed range covered being 600 to 6000 r.p.m. The maximum temperatures reached on these engines ranged from 1176 to 1490 deg. F. Temperatures were reduced by extending the valve guides toward the valve head, by increasing the valve-stem diameter, and by using copper instead of cast iron as a valve-guide material. Temperatures were approximately the same with gasoline and with gasoline-benzol mixtures, but were considerably lower with methanol (wood alcohol). Tests carried out with gasoline and gasoline-benzol mixtures showed a reduction in valve temperature with increasing compression ratio, the reduction not being as great, however, as the reduction in exhaust-gas temperature. With methanol fuel there was a slight increase and then a slight decrease in valve temperature as the compression ratio was increased from 6:1 to 15:1. Too high a compression ratio for any given fuel resulted in

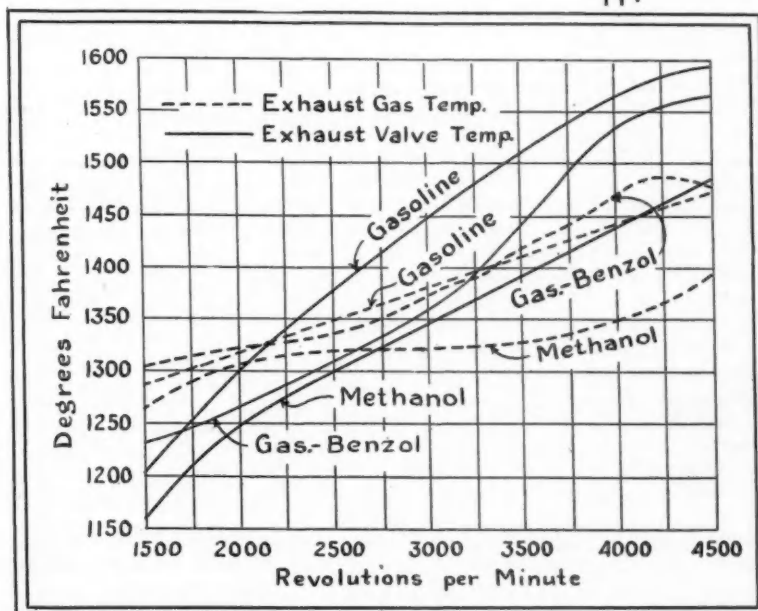


Fig. 2—Exhaust gas and exhaust-valve temperatures of J.A.P. water-cooled engine with long valve guide

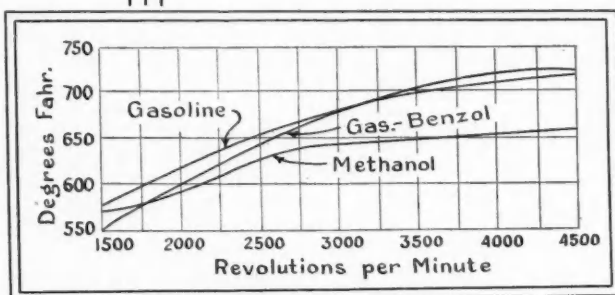


Fig. 3—Valve seat temperatures of J.A.P. water-cooled engine

of 562 deg. F. to a maximum of 0.049 in. for a valve temperature of about 1370 and a seat temperature of 646 deg. F., and then dropped to 0.020 in. for a valve temperature of 1430 and a seat temperature of 660 deg. F. This decrease in the rate of valve-seat wear at the higher temperatures is thought to be due to the rapidly decreasing hardness of the valve at these temperatures. It is impractical, however, to seek to reduce valve seat wear by operating the valves at a temperature approaching 1475 deg. F., and the operating temperature should be as much below 1370 deg. as possible.

When operating at a temperature of 1320 deg. F. and with a clearance of 0.020 in. these valves caused a shrinkage of 0.008 in. in 10 hours and 0.040 in. in 50 hours, regardless of initial valve-seat width, the width being varied in the test from less than 0.025 to more than 0.150 in.

With the silicon-chromium-steel valve the sinkage increased with the valve temperature up to the maximum value to which it was carried (about 1525 deg.) for both 0.006 and 0.020 in. clearance. But whereas with the KE.965 steel the sinkage was due almost entirely to wear of the seat, with the silicon-chromium steel it was largely due to stretch in the valve head, the wear on the valve seat in 50 hrs. never amounting to more than 0.005 in., and in many cases was unmeasurable. The distortion observed was principally in the form of dishing of the head.

This difference in the behavior of the two steels is thought to be attributable to differences in their strengths and hardnesses, and a chart is included in the report which shows that the tensile strength of the KE.965 steel decreases fairly uniformly from 90,000 lb. per sq. in. at 1200 deg. F. to 44,000 lb. per sq. in. at 1560 deg. F., while the tensile strength of silicon-chromium steel decreases from 76,000 lb. per sq. in. at 1200 deg. F. to 16,500 lb. per sq. in. at 1560 deg. F.

The second part of the report deals

with measurements of the temperatures of valves and seats. These measurements were made on the four engines already mentioned, whose individual cylinders had displacements ranging from 15.25 to 55.5 cu. in. Valve-seat temperature was measured by means of a thermo-couple inserted into a $\frac{1}{8}$ -in. hole extending to within $\frac{1}{16}$ in. of the seat, while valve temperature was measured by means of an optical pyrometer aimed at the junction between head and stem, through a $\frac{1}{4}$ -in. peep-hole drilled in the wall of the exhaust manifold or through the exhaust manifold flange and the cylinder block, according to the particular engine. The arrangement used on the J.A.P. water-cooled engine is shown in Fig. 1. Measurements of the exhaust-gas temperature were made by inserting a thermo-couple through this peep-hole, and these measurements, of course, gave a mean value for the whole cycle.

Tests were made with three different fuels, viz., Shell No. 1 gasoline, a 50-50 mixture of ethyl gasoline and benzol, and methanol, which latter contains 97 per cent of methyl alcohol. Exhaust-gas and valve temperatures for the speed range 1500-4500 r.p.m. are shown in Fig. 2. It will be seen that at the higher speeds both the valve temperature and the exhaust-gas temperature are materially lower with methanol fuel. This is due to its higher latent heat of evaporation, which amounts to about 500 B.t.u. per lb., as compared with about 135 B.t.u. per lb. for gasoline, besides which the methanol-air mixture contains about $2\frac{1}{4}$ times as much fuel as a gaso-

line-air mixture. It will be noticed that the exhaust-gas temperatures are of the same order as the exhaust-valve-head temperatures, the gases being somewhat cooler than the head at low speeds and hotter at high speeds.

The results shown in Fig. 2 were all obtained with the same compression ratio of 5.4 so that the different fuels were not used at their highest useful compression ratio.

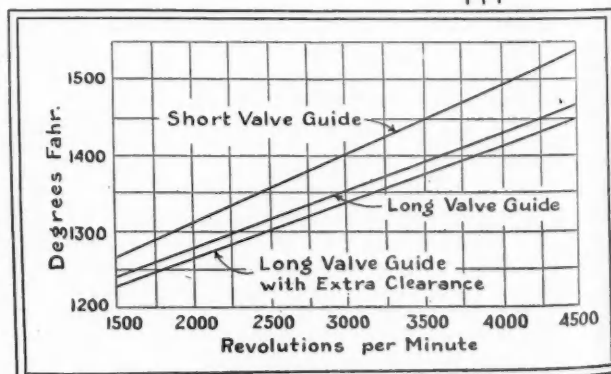
Valve-seat temperatures with all three fuels, plotted against engine speed, are shown in Fig. 3.

The heat absorbed from the burning gases by the valve head is dissipated mainly through two channels, viz., the valve seat and the stem and guide. To determine the increase in the cooling effect obtainable by carrying the guide closer to the valve seat, experiments were made with the two valve-guide lengths indicated in Fig. 1. It will be seen from Fig. 4 that compared with the short guide, the long one reduced the valve temperature by 27 deg. F. at 1500 r.p.m. and by 72 deg. at 4500 r.p.m. The effect on the valve seat was small, however, amounting to only about 10 deg. over the whole speed range.

An objection to a long valve guide is the impossibility of lubricating the guide where it projects into the exhaust port and attains very high temperatures, the result being rapid wear of valve stem and guide. Experiments were therefore carried out with a long valve guide whose part projecting into the exhaust port had an enlarged diametral clearance of 0.016 in., so there could be no contact between stem and guide in this region. The results with this arrangement, plotted in Fig. 4, show that it was even better than the plain long guide, and indicate that the principal function of the top portion of the guide is to protect the stem against the heat of the exhaust gases rather than to act as a channel for the dissipation of heat from the stem.

Similar tests were made on a J.A.P. air-cooled racing engine in which the

Fig. 4—Effect of valve-guide length and form on exhaust-valve temperature (J.A.P. water-cooled engine, Shell gasoline)



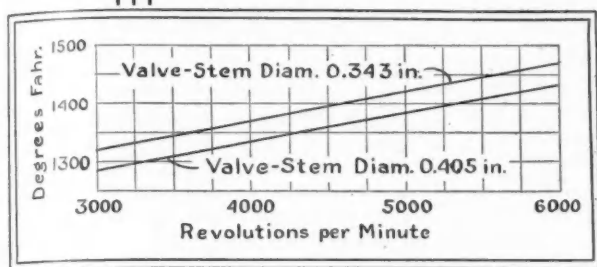


Fig. 5—Effect of valve-stem diameter on exhaust-valve temperature (J.A.P. air-cooled engine, gasoline-benzol fuel, compr. ratio, 7.9)

If the compression ratio is carried too high for the fuel used, detonation results and the effect on the exhaust-valve temperature is unfavorable, as shown by Fig. 8. It will be observed that in this series of tests (run with the 50:50 mixture of gasoline and benzol), as the compression ratio was increased from 6 to 10 and then to 12, the exhaust-valve temperature was successively reduced over the whole speed range. But when the compression ratio was still further increased, to 13.24, detonation occurred at the lower speeds, with resultant increase in exhaust-valve temperature, while at the higher speeds the detonation ceased and this compression ratio resulted in lower exhaust-valve temperatures than any of the lower ratios.

With the Thornycroft engine tests were made on the effect of cooling-water outlet temperature, and they showed that, as already mentioned, both the valve temperature and the seat temperature varied by substantially the same amount as the water outlet temperature, throughout the speed range.

It is usually assumed that exhaust-

compression ratio could be varied from 6 to 15, and it was found that in this case lengthening of the valve guide had less effect, lowering the exhaust-valve temperature only about 9 deg. on the average, as compared with from 27 to 72 deg. in the case of the water-cooled engine. On this engine an appreciable reduction in valve-head temperature was obtained by increasing the valve-stem diameter from 0.343 to 0.405 in., as shown in Fig. 5. This change in diameter increased the cross-sectional area (path of heat flow) of the stem 37 per cent, and the area of contact between stem and guide, 17 per cent. The weight of the valve was increased $\frac{1}{4}$ oz. or by 7.4 per cent, and the reduction in valve-head temperature amounted to from 12.5 to 27 deg. A further reduction in valve-head temperature was obtained by using copper instead of cast iron for the guide, but the gain was relatively small. With a short copper guide the lowering in temperature attained a maximum value of 18 deg. F., as compared with a similar cast-iron guide, and with a long copper guide the temperature reduction was 54 deg. F. as compared with the short iron guide, at the higher speeds.

Further experiments at high compression ratios were made with this engine, and the effects of compression ratio on the exhaust-gas and exhaust-valve temperature at speeds of 3000 and 5500 r.p.m. are shown in Figs. 6 and 7. Only the gasoline-benzol mixture and the methanol could be used with these higher compression ratios. It will be noted that in every case, as the compression ratio increases the exhaust-gas temperature decreases. The effect on valve temperature is different, however, and the charts indicate that an increase in compression ratio may be accompanied by either an increase or a decrease in exhaust-valve temperature. This emphasizes the fact that exhaust valve temperature is dependent not only on the exhaust-gas temperature but on the general temperature of the cycle. Increase of the compression ratio from

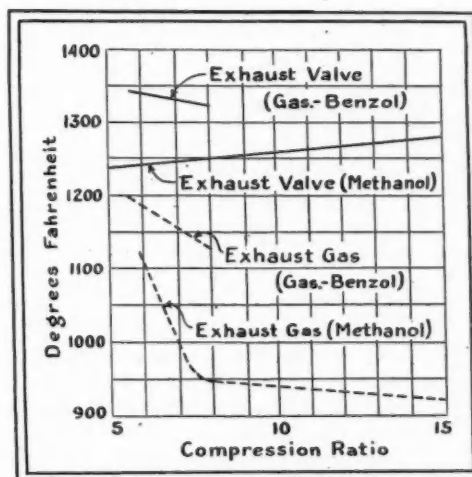


Fig. 6—(Above) Effect of compression ratio on exhaust-valve and exhaust-gas temperatures (J.A.P. air-cooled racing engine, 3000 r.p.m.)

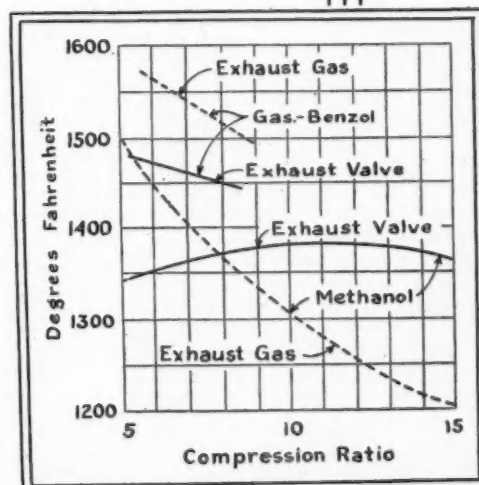


Fig. 7—(Right) Effect of compression ratio on exhaust-valve and exhaust-gas temperatures (J.A.P. air-cooled racing engine, 5500 r.p.m.)

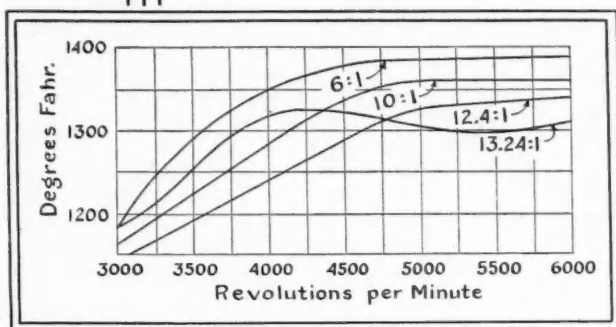


Fig. 8 — Showing ill effect of excessive compression ratio on exhaust-valve temperature (J.A.P. air-cooled racing engine, gasoline-benzol mixture)

valve temperatures are highest with retarded ignition and with weak mix-

tures, probably because there are indications that the exhaust pipe is hottest under those conditions. A large number of tests carried out on the Thornycroft engine showed that the reverse holds true, namely, that weak mixtures and retarded ignition tend to reduce the exhaust-valve temperature. This again

is due to the fact that exhaust-valve temperature is determined not only by the exhaust-gas temperature, but also by the explosion temperature, which is probably considerably reduced by weakening the mixture and retarding the ignition.

One of the most interesting tests made on the Austin 12/6 engine was to determine the effect of the substitution of an aluminum cylinder head on the exhaust-valve temperature. Although this is an L-head engine and the valve, therefore, does not come in contact with the head, the substitution of an aluminum for an iron head resulted in a decrease of about 18 deg. F. in the valve temperature and about 63 deg. F. in the seat temperature. The advantage of a small cylinder size was brought out by the tests on the Austin, whose exhaust valve reached a maximum temperature of only 1188 deg. F., as compared with about 1500 deg. F. in some of the other engines. The exhaust valve of the Austin has a diameter of 1 3/16 in. while the diameters of the other engines range from 1 9/16 to 1 3/4 in.

The Forum—

Power Required to Drive Fans

Editor AUTOMOTIVE INDUSTRIES

In the Jan. 13 issue of *Automotive Industries* I noticed a few remarks titled "Independent Fan Driving Considered Inefficient." After reading this it is apparent that there is very little information available to show just how much power the fan on the average water-cooled engine consumes.

Some years ago the writer made a study of the power consumption of several fans on both water-cooled and air-cooled engines and found that fans consumed a surprisingly high amount of power. A 320-cu. in., eight-cylinder, water-cooled engine consumed 7 hp. at 3000 r.p.m., or at 60 m.p.h. car speed. It is readily seen that if an electric motor is used to drive this fan with 60 per cent efficiency and at six volts, 1450 amperes would be necessary. This, of course, is entirely out of the picture. A 272-cu. in. air-cooled engine at this speed required 4.2 hp., or less power per cubic inch to drive the fan than the eight-cylinder water-cooled engine.

This investigation, however, showed that, all things being equal, two well-designed engines, one air-cooled and one water-cooled, would consume about the same horsepower to drive the cooling fan for the same piston displacement.

It is my conviction that the cen-

trifugal blower could be worked into some of the water cooled designs, especially with the new type of stream lining, with a possible saving in power over that consumed with the propeller type of fan. In addition, the centrifugal blower could supply air under higher pressure if it was desired to use it for car ventilation.

C. T. DOMAN

Steering and Rear-End Ratio Options Suggested

Editor AUTOMOTIVE INDUSTRIES

In a recent issue of *Automotive Industries* you published tests of steering of trucks with various weight distributions, but you failed to make it clear that the best condition was (presumably) with equal distribution and a condition of more weight on the front than rear wheels, as might be met in a passenger car, would (probably) produce a violent skid.

Is it not time to deplore the modern tendency of making steering

gear ratios so high numerically as to constitute a nuisance in traffic and a positive hazard in an emergency, to provide a talking point for sales to people whose physical limitations prevent much or fast driving?

If we can have options in color and compression ratio, why not in steering and rear-end ratio which are so much more important to the driver? If he does not know of its importance, it can be a new sales argument.

E. R. MORTON, M.E.

New Brake and Performance Rules Feature Proposed Changes in Uniform Traffic Act

PERFORMANCE standards and new braking regulations calling for a 30-ft. stop from 20 m.p.h. are among the important revisions proposed in the draft of the Uniform Act Regulating Traffic on Highways which will be considered by the Committee on Uniform Traffic Laws and Ordinances which meets in Washington May 21 and 22, prior to the National Conference on Street and Highway Safety on May 23-25.

Copies of the draft of this model act as well as of the drafts of the Administration, Registration and Certificate of Title Act, the Operator's License Act, the Civil Liability Act and the Financial Responsibility Act, may be obtained from A. W. Koehler, secretary of the National Conference of Street and Highway Safety, Department of Commerce. In their final form these acts are intended to guide state legislatures in drafting motor vehicle legislation, the object of the model acts being, of course, to secure uniformity in the statutes of the different states.

The size and weight limitations proposed in the draft of the model traffic act in the main parallel the recommendations of the American Association of State Highway Officials. However, where the Highway Officials' code exempts from the 8 ft. limit vehicles now in operation which are over-width due to the installation of pneumatic tires, the draft specifies in such cases an absolute maximum exemption of 8 ft. 6 in. with a maximum body width of 8 ft. The draft also limits operation of combinations of vehicles over the 45 ft. length limit when transporting poles, pipes, etc., to the day time. Railroad interests are understood to be opposing the inclusion of these physical standards in the Act and are expected to submit a report attacking them at the Washington conference.

As reported in *Automotive Industries* of April 28, the inclusion of a definite performance standard, which the Highway Officials covered with a general proviso against operation at speeds that block traffic, is under consideration. This would require all vehicles operated outside of business and residential districts to have power adequate to propel at a reasonable speed such vehicles and the permissible load thereon or to be drawn thereby. Suggested "rule of thumb" tests of performance ability for administering this provision are that the powerplant have one cu. in. of piston displacement for each 100 lb. of gross weight, or that power be adequate to propel the loaded vehicle up a 3 per cent grade at a minimum speed of 20 m.p.h.

Service brakes according to the draft would be required to stop any vehicle or combination from 20 m.p.h. within 30 ft. on dry asphalt or concrete pavement. The requirement for the hand brake is set at 55 ft. from 20 m.p.h. Trailers and semi-trailers with a gross weight in excess of 3,000 lb. would be required to have adequate brakes controlled from the driver's cab and so designed that they will apply automatically in the event of a breakaway. Brakes on all wheels would be required on all new vehicles including trailers and semi-trailers.

The draft makes speeds in excess of the following prima facie evidence of reckless driving:

- 20 m.p.h. in business districts.
- 25 m.p.h. in residential districts.
- 45 m.p.h. elsewhere.

This contrasts with the recommendation of the state highway officials that passenger car speeds should be reasonable and prudent, and that truck and bus speeds should not exceed 45 m.p.h.

The draft also requires the motor vehicle commissioner to stage inspection campaigns either once or twice a year during which all vehicles must be checked for compliance with the safety requirements of the law by an official inspection station.

The proposed uniform financial responsibility act requires that where revocation or suspension of an operator or chauffeur's license is mandatory, the suspension or revocation shall remain in effect until proof of future financial responsibility has been furnished, and until any final judgment of more than \$100 resulting from a motor vehicle accident has been satisfied. A discharge in bankruptcy does not relieve the judgment debtor of his responsibilities in this connection. However, payments of \$5,000 in the case of death or injury to one person, or of

\$10,000 where more than one person is involved, where the judgments exceed these sums, would be considered satisfaction for the purpose of the Act. In other words, payment of these sums would permit restoration of the license, although, of course, civil liability for the unpaid balance would not be affected. Where the court permits payment of the judgment in installments, the debtor's license could not be suspended and, if suspended, would have to be restored.

The financial responsibility requirement is \$5,000/\$10,000 public liability and \$1,000 property damage.

Under the driver's license act, as revised for the coming Conference, revocation of license is mandatory for manslaughter, driving while intoxicated or drugged, any felony involving use of a motor vehicle, failure to stop and render aid, perjury in connection with the motor vehicle laws, and conviction or forfeiture of bail on three reckless driving charges within a year. In addition, licenses may be suspended for habitual violation of traffic laws and incompetency.

The proposed civil liability act limits the responsibility of the owner of a vehicle for the acts of a person operating it with his permission to \$5,000/\$10,000 public liability and \$1,000 property damage. This provision, however, does not impose liability where the vehicle is operated by a garage or repairshop in the course of storing, servicing or repairing such vehicle, nor does it apply when the vehicle is being operated under a conditional sale contract or its equivalent. Guests riding without paying for the privilege cannot recover except on proof of intoxication or wilful misconduct.

Extensive revisions have also been made in sections governing headlamp equipment to provide for control of multiple-beam devices without outlawing single beam equipment now in service.

Diamond T Announces New Series

Mechanical Improvements and Stronger Construction Feature New Series

A SERIES of new truck models at new prices was announced by the Diamond T Motor Car Co. on May 1. These models are new editions of the old ones, embodying certain mechanical improvements and particularly strengthened construction, which has permitted increasing the gross-weight ratings.

The gross weight rating of Model 211 (1½ tons) has been increased from 8500 to 10,000 lb. The chassis weighs 3140

lb. and is equipped with 32 by 6 in. ten-ply tires. Model 211-S lists at \$595 and 211-D at \$625.

Model 226 (1½ tons) has had its gross-weight rating increased to 10,500 lb. as a result of the adoption of a heavier rear axle. Model 226-S is listed at \$725 and 226-D at \$760.

Model 241 has been replaced by Model 242 (1¾ tons) which has a Clark rear axle considerably heavier than the axle previously used. Rear-tire equipment is now 6.00/20-in.

duals, the gross-weight rating is 11,000 lb., and the price remains the same as that of Model 241, viz. \$845.

Model 261 is replaced by 262 (1¾-2 tons) with a gross rating of 12,000 lb. It has a new Clark rear axle, a larger engine (six-cylinder 3½ by 4¼ in.) and the same front axle, steering gear and clutch as the larger model 311. A governor is standard equipment on this model. The latter is now identical with the Model 311 2-ton truck, except for the rear axle, and it lists at \$845.

The only change in the Model 311 2-ton truck, now known as the 311-B, is that it has been equipped with a bevel-driven rear axle and with heavier tires, 34 by 7 in., dual rears. This model has a gross rating of 13,000 lb. and lists at \$1,060.

In place of Model 326-DR the company is now offering the Model 311-DR (2½ tons) with a gross rating of 14,000 lb. and a list price of \$1,345. Radius rods are standard equipment on the double-reduction axle, and the largest tires fitted are 8.25 by 20 in.

Model 351-B (2½ tons) with a gross rating of 15,000 lb., takes the place of Model 351 with which it is identical except for the fact that it has a Clark R-116A transmission with five forward speeds. The largest tires

supplied on this model are 8.25 by 20 front and 9.00 by 20 dual rear. Model 351-B lists at \$1,375.

Model 351-DR (3 tons), which takes the place of Model 376, has a gross rating of 16,000 lb., its tire equipment is the same as that of Model 1351-B, and it lists at \$1,650.

Model 410-A is replaced by Model 411-B (3 tons), which has a gross rating of 17,000 lb. and lists at \$1,895. This model has a V front like 351-B, a stronger (10-in., tapered) frame, and the new Clark heavy front axle which permits of the use of 9.00 by 20-in. tires (dual rear). The Clark R-909 transmission is used.

Model 411-DR (4 tons) takes the place of Model 425 and is substantially the same as Model 411-B except that it has a six-cylinder 4¼ by 4½-in. engine and the Timken-Wisconsin 70,000 double-reduction rear axle. This truck has a gross rating of 18,000 lb. The front axle is heavier than that of the former Model 425. Heavier tires (9.75 by 20) are used all around, and the list price is \$2,195.

Model 511-B (4 tons) has a gross rating of 18,000 lb. and lists at \$2,195. It has a larger engine (4¼ by 4½-in.) than the old Model 510, which it replaces, a new front

with V-shaped radiator, a 10-in. tapered frame, and a heavier front axle.

Model 511-DR (5 tons) takes the place of Model 525. It is rated at 20,000 lb. and lists at \$2,550. Its specifications are substantially the same as those of Model 525 except that it carries the new radiator, a new front axle and an improved rear axle. Heavier tires (10.50 in.) are also included in the specifications.

Model 740-A (5-6 tons) takes the place of Model 603. It has a gross rating of 22,000 lb. and lists at \$3,695. A six-cylinder 4¾ by 4¾-in. engine is now standard for this chassis, as well as a new transmission, while the tire size remains the same as on 603.

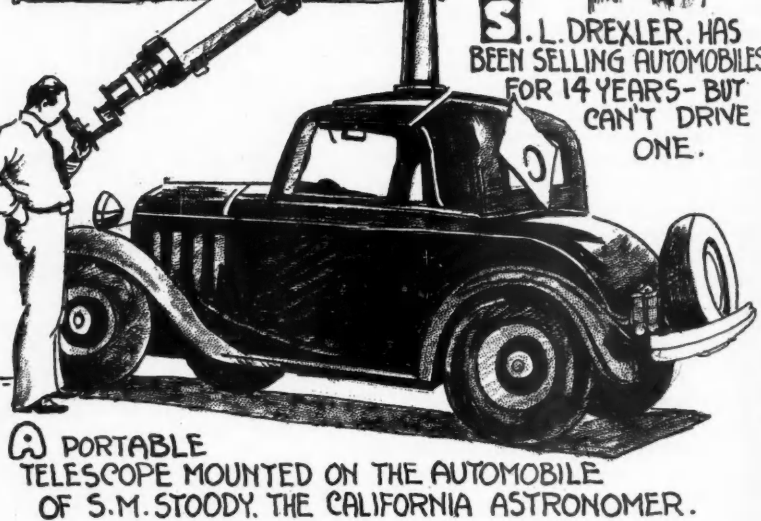
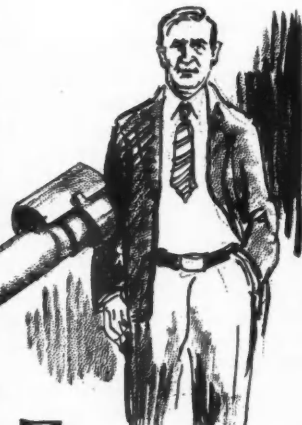
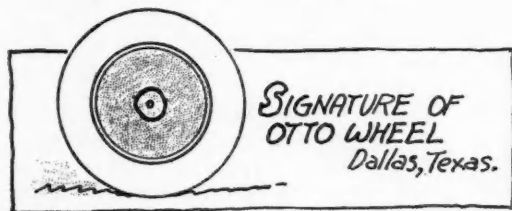
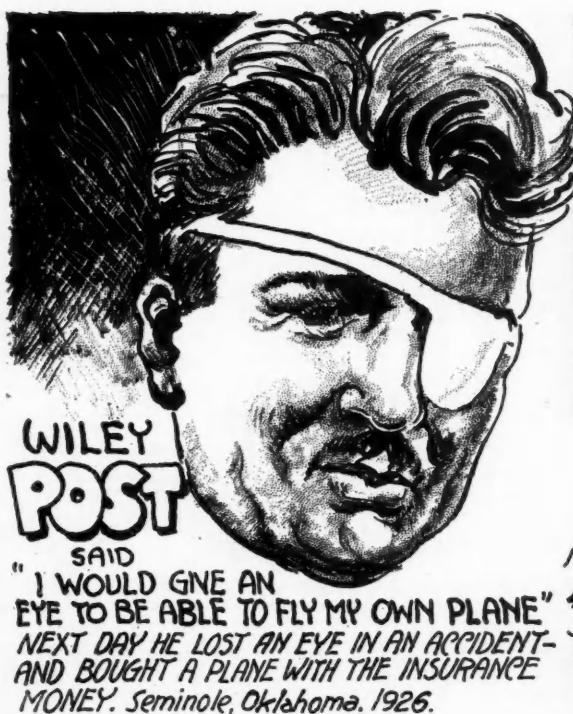
Model 750-H has been dropped, but Model 750 (5-7½ tons) is continued, with a gross rating of 28,000 lb. It carries an improved transmission, and Westinghouse air brakes as standard, though hydraulic brakes may be substituted, in which case there is a reduction from the regular price of \$4,600.

Model 1515 (7½-10 tons) has a gross rating of 36,000 lb. and lists at \$6,800.

A wide variety of cabs are available on all models from 211 to 511-DR, including the standard vestibule cab, the deluxe streamlined cab, the new deluxe sleeper cab.

Automotive Oddities—By Pete Keenan

Write us if you know an Oddity



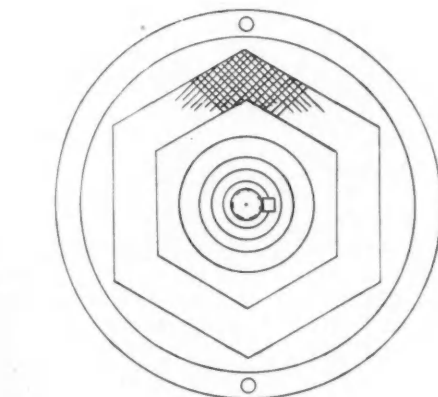
NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Trinity Resilient Drive

Trinity Wheel Corporation, 117-119 West 46th Street, New York, has developed a resilient driving mechanism for motor vehicles on which it has been granted one patent by the U. S. Patent Office and has a number of additional ones pending. The cushioning member, which consists preferably of suitably cured rubber, is located in the hub of the driving wheels. One difference between this and earlier designs of flexible hubs is that the axle load is trans-

ferred to the wheel not through the resilient member but through an anti-friction bearing, so that wheel and axle always remain concentric.

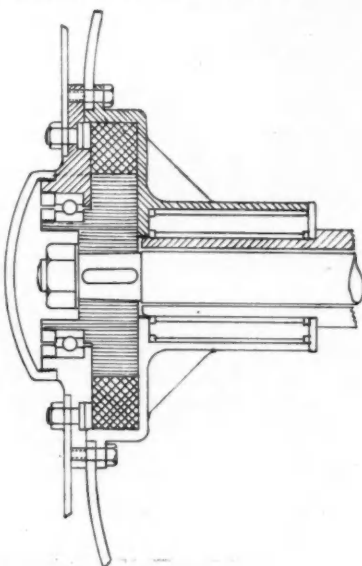


ferred to the wheel not through the resilient member but through an anti-friction bearing, so that wheel and axle always remain concentric.

One application of the Trinity resilient drive principle is shown more or less diagrammatically by the drawing reproduced herewith. To the end of the axle shaft is keyed a driving member of hexagonal form, the latter being surrounded by a hexagonal ring of molded

rubber which fits snugly into the wheel hub. A member corresponding in some respects to the usual hub plate is bolted to the hub and has the wheel disk bolted to it. It is supported on the driving member by a ball bearing. There evidently can be no motion at this ball bearing except for that allowed by the angular distortion of the resilient member.

The object of the resilient member in the hub is, of course, to smooth out fluctuations in the driving torque, whether these be due to the normal



variations in the engine torque, irregular operation of the engine, too rapid engagement of the clutch, or road obstructions. It is claimed that the Trinity resilient drive, which has been tested out on a Dodge four-cylinder car, not only improves the riding qualities greatly, but also decreases strains on driving members, prolongs the life of tires, and has a tendency to reduce skidding.

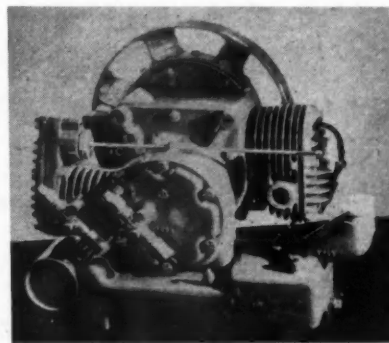
Single Cylinder Industrial Engine

Waukesha Motor Co., Waukesha, Wis., has developed a single-cylinder, four-cycle, air-cooled $\frac{3}{4}$ -hp. engine for industrial uses. It is said to be unusually quiet in operation and it is being used as the power unit of a milk cooler, an ice machine, and a refrigerator, making these appliances available in districts where there is no electric service.

The engine has a bore and stroke of $2\frac{1}{4}$ in. each and operates at 1250 r.p.m.

It is provided with a Ricardo head and has a compression ratio of 4:1, which makes possible the use of fuels down to 60 octane. A crankshaft of Z-metal is used and is fitted with counterweights. It runs in precision steel-backed babbitt-lined bushings. The connecting rod is a small aluminum forging with the bearing directly in the rod metal itself, the cap being held by two heat-treated bolts. The piston pin is $\frac{9}{16}$ in. in diameter, in an aluminum piston, and although the pin is a press fit when cold, it is allowed to float and probably does as the piston warms up.

There are three rings, one standard compression ring, one of the new type Perfect Circle oil-control rings, and the other a typical slotted ring made by the Wausau Company. Baffling inside the crankcase controls the splash oiling system and prevents flooding of the cylinder, and the scraper rings communicate with a port on the bottom side of the cylinder to drain the surplus oil



back to the crankcase through the valve chamber.

A unique feature of the "ice engine" is the nice running balance secured with the compressor. The latter is driven from the camshaft at half engine speed, and is so timed that its compression stroke corresponds with the power stroke of the engine. The ball bearing on the compressor side supports the camshaft with the eccentric and counterweight for the compressor. The compressor has the same bore but only half the stroke of the engine.

The carburetor, a Tillotson, is in reality a mixing valve or gasoline reservoir above the level of the tank itself. Fuel is carried in the hollow cast base of the engine, and there is said to be no possibility of leaky seams and of dripping, as there are no joints below the gasoline level.

It is claimed that with this little unit 50 lb. of ice can be produced from tap water in four hours, with a fuel consumption of approximately one pint.

High Speed Tooth Chamfering Machines

W. C. Lipe, Inc., Syracuse, N. Y., announces a new gear tooth chamfering machine producing up to 150 teeth per minute. It will chamfer all kinds of gears and pinions, such as spur, helical, internal, intermittent and spiral bevel; also splines, cut back intermittent teeth and drill. The machine is built in both double and single spindle models and also a special model for flywheel ring gears.

The principle of high speed indexing which has been in successful use on the Lipe machines for the past two years is incorporated in this new model and the working parts of the machine have

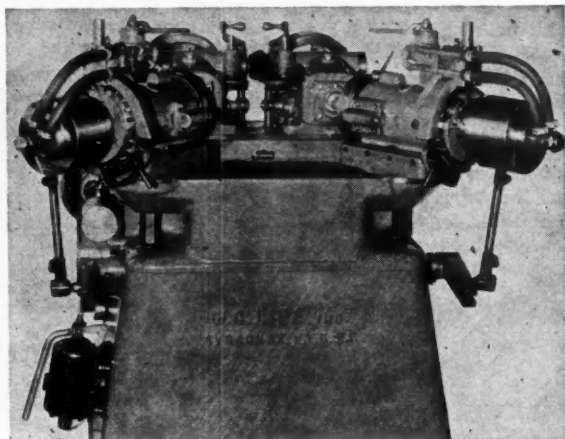
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NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

been strengthened and redesigned in keeping with the high speeds possible with this index mechanism.

The spindle is ball bearing mounted using preloaded selected ball bearings. The rack and pinion for driving the square sleeve are made of preheat-treated steel and the rack is so mounted that it can be turned end for end as wear occurs, or can be replaced without replacing the square sleeve.



Streamlined Electric Drill

The Black & Decker Mfg. Co., Towson, Md., announces a 1/4-inch special electric drill with modern streamline design.

Motor power has been increased 33 1/3% over previous models. Anti-friction bearings are used throughout, with the armature and chuck spindle mounted on ball bearings. There is also an entirely new switch handle. The tool weighs only 5 1/4 pounds. It has a Universal motor, furnished for all voltages.

New Metallic Filtering Element

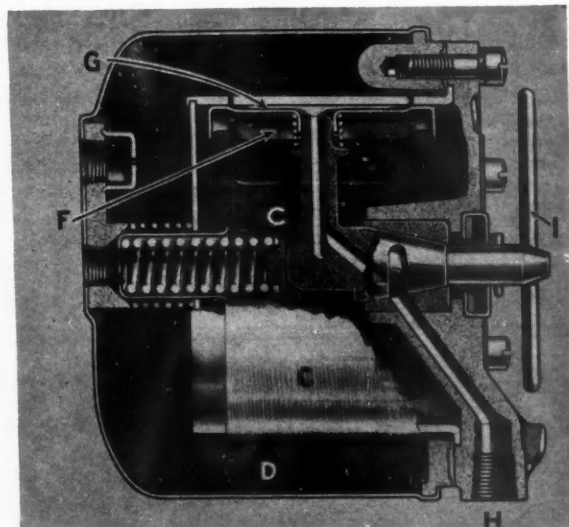
A line of oil filters incorporating a new metallic filtering element requiring no replacement is being announced by the Handy Governor Corp. of Detroit. The filters are self-cleansing—either automatically or semi-automatically.

As shown in the illustration the filter element comprises a cage with a number of openings in it. The outside of the cage is threaded, and in the thread is laid a continuous tinned steel wire, wound around the cage. With a thread of fixed pitch, the width of the filtering space evidently depends on the size of the wire, and the width can be varied within the limits of 0.0004 and 0.0044 in.

Incidentally, the shape of the open-

ing in cross section approximates that of a venturi, on account of the side-by-side location of the round wire strands, which is said to assure the maximum flow capacity.

Cleaning of the filter element is accomplished on the back-wash principle.



On the inside of the element there is a shoe, which can be rotated so as to register with each of the apertures of the filter cage in succession. The pressure in the filter then produces a reverse flow of oil through the screen, the oil

and entrapped dirt passing out of the filter through an orifice in the shoe and drilled leads in the shoe-operating cranks. Each segmental opening is said to be cleaned almost instantaneously.

One interesting application of this filtering principle is in a full-flow filter located in the crankcase. The shoe is continuously driven through a reduction from the oil-pump shaft, for continuous cleaning of the filter. The dirt is returned to the crankcase through a lead which preferably discharges near the drain-plug hole.

This filter is available in both the manual and intermittent cleaning types, for both replacement and factory installation. The intermittent type is located outside the crankcase, the shoe in the filter being turned by means of a crank with ratchet. This crank can be hooked up to either the clutch or the brake pedal, and the "backwashed" oil and dirt returned to the crankcase. The filter, of course, must be installed on the pressure side of the pump.

This type, as well as the more conventional manual-cleaning type, is provided with a by-pass valve. The manual control type is provided with a drain plug. To clean the filter, this plug is removed, and with the engine running the handle is given a full turn,

which cleans every segment. In comparison with the crankcase contents, the amount of oil rejected during the cleaning operation is very small.

A noteworthy feature of this filter is the small size of the filtering unit.